Specialties Flowsheet

MARCH 1956
35 CENTS

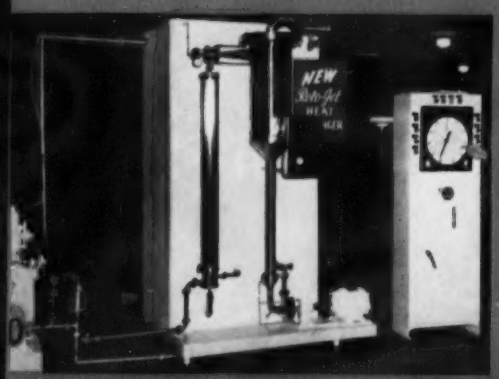
FOOD ENGINEERING

A McGRAW-HILL PUBLICATION

PACKAGING • Stacking permits machine packing in modernized bakery. p. 56

PRODUCTS • Heat-and-serve dishes put new life in old food business. p. 50

PROCESSING • Pace-setting unit operations and efficient multiple-line layout produce 2½ tons of chips an hour. p. 68



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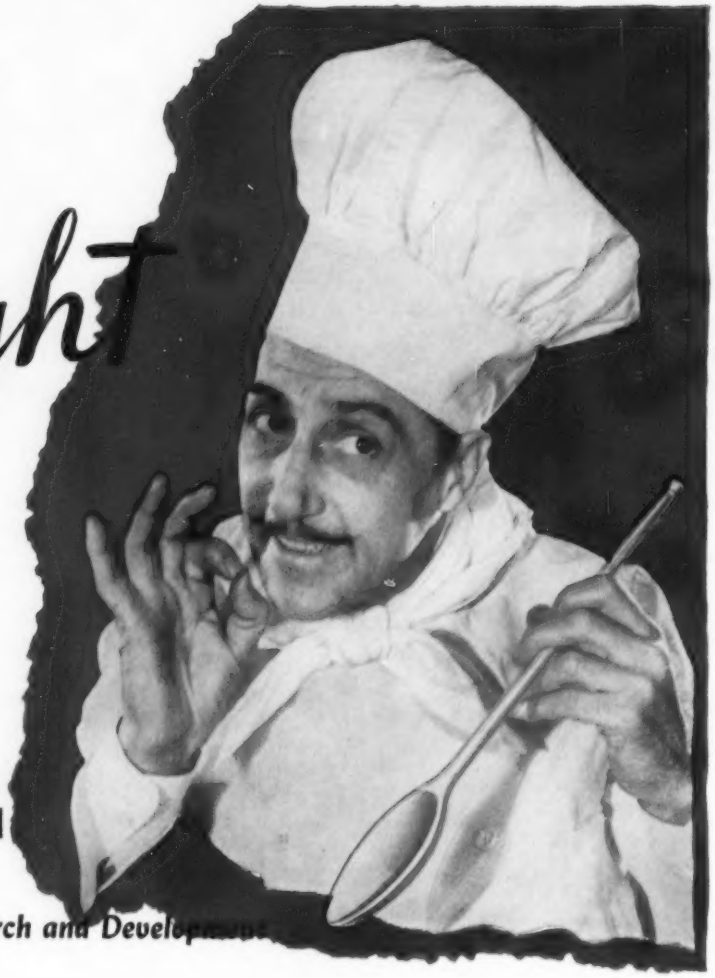
INQUIRY COUPON INSIDE BACK COVER

Just Right



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MARCH 1956

Volume 28 Number 3

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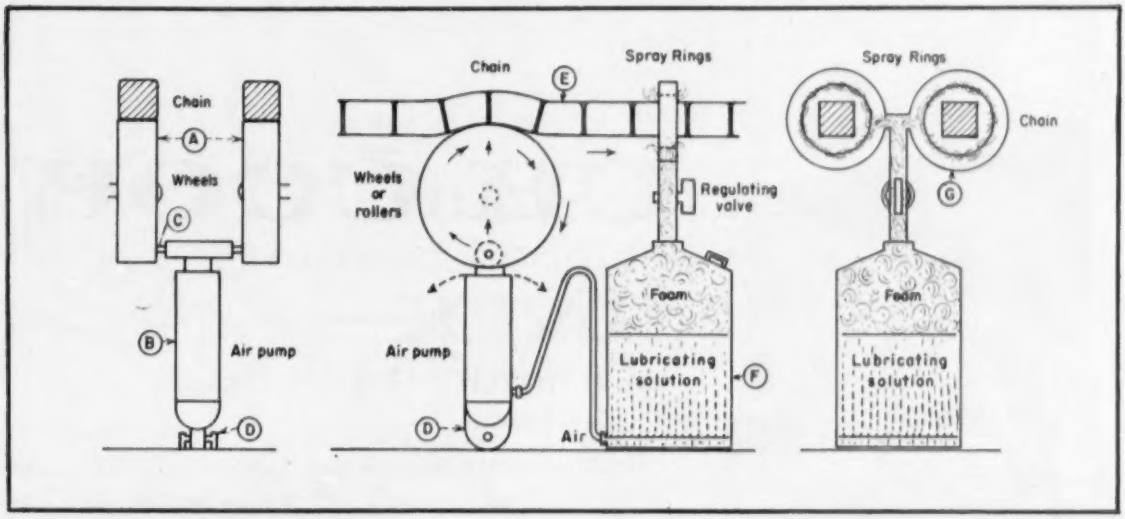
PRACTICAL IDEAS



Improvised Foam Lubricator

In plants where there is no compressed air available but where foam-lubrication of conveyor chain is desirable, simply fabricated equipment may be installed to supply adequate lubricating foam. Here's how it's done.

Two duplicate wheels or rollers—(A) in sketch—have rim widths of about 1 in. and diameters of 4-5 in. At a distance from the axis of the wheels equal to slightly less than half the piston travel of a small, readily-procured air pump (B), attach a rod (C) between them to serve as shaft for operating the air pump plunger as the wheels rotate.

A pivot arrangement (D) is added to the air pump when a pivot-bottom type is not easily procurable.

To install, place wheels against and under the chain conveyor (E) so they will rotate by movement of the chain pressing against them. Now, pipe air outlet from the pump to bottom of soap solution reservoir (F) and then provide for an outlet (G) from the reservoir to spray foam on chain conveyor.—*Andrew Moldavan, Guaranteed Pure Milk Co., Ltd., Montreal.*

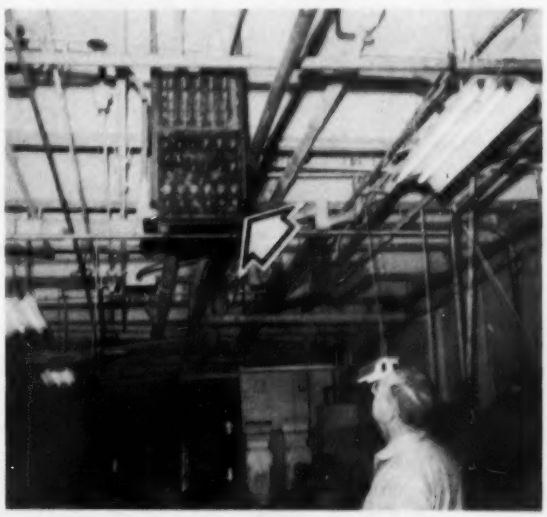
Lab-To-Plant Signal Systems

Here's a way to save a lot of time in tipping off the production department on final test results of samples collected by the laboratory.

In our specific case, we installed signalling, pilot-light boards in the quality-control laboratory and processing department (at the refining mills). Purpose was to eliminate repeated verbal relaying of test findings (fineness and viscosity of chocolate) to the production department. Distance the lab technicians had to cover was not too far—about 600 ft. to-and-fro. But, with our present signalling system, results are more speedily passed on to production.

Panel boards consist of three rows of a dozen (one for each refining mill) pilot lights. Red lights in top row are individually flicked on as a signal that the product is too coarse. Middle row of green lights indicates too fine a product. Bottom row of white lights means that the grind is okay.

Lab technician relaying signal also presses a button,



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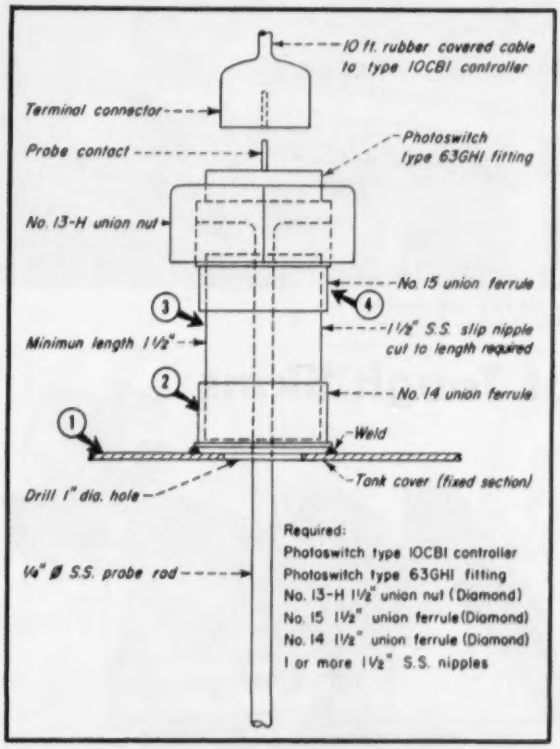
which sounds an alarm bell that calls signal to mill operator's attention so he can adjust mill accordingly. Operator brings another sample into the lab (if mill needs adjustment) and cycle repeats until chocolate is ready to proceed in-process.

Panel boards also comprise two rows of ten pilot lights for viscosity information. Top row of red lights indicates batches under test have not been refined to the right consistency.

Each time a red light flashes on mixing operator's panel board, he must contact lab technician to find out how much cocoa butter or butter must be added. A retest sample is submitted to the lab until viscosity checks out. Then lab flashes second row of white "okay" signals.—*Roy F. Korfhage, Technical Director, Ambrosia Chocolate Co., Milwaukee.*



One Control for Any Level

Here's an idea for mounting a liquid level probe for controlling the level of liquids in a vessel. This probe, which is manufactured by Photoswitch Div. of Electronics Corp. of America, was designed for use in dairies, breweries and other food processing plants and meets all sanitary requirements.

Usually, probe length is not adjustable so the probe must be cut accurately to length before installation. In case it is necessary to change the minimum or maximum of the liquid level, the probe must be discarded and replaced with a probe of correct length.

However, with proper mounting the probe may be easily adjusted for various liquid levels and still meet all sanitary requirements since all parts used in the assembly are approved sanitary fittings and readily available.

Easily welded over an opening in the tank cover—(1) in sketch—is the bevel surface of a No. 14 union ferrule (2). Now, a slip nipple (3) is fitted between a No. 15 union ferrule (4) and the No. 14 union ferrule, both of which are provided with an inside shoulder. Thus, a snug fit and correct alignment of the entire assembly will be assured.

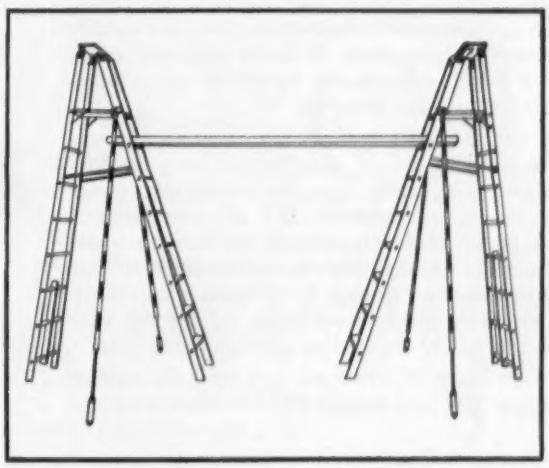
It is often necessary to adjust the height of the probe after installation. If the probe rod is cut too short this would be impossible without some similar type assembly. As it is with this arrangement the probe rod is cut to the maximum length required for the low liquid operating level that will be required in the tank. When it is necessary to raise the liquid level control point a longer slip nipple is cut and adjusted in place of the shorter nipple. With this arrangement the rod can easily be removed for cleaning or replacement.

Slip nipples of various lengths can be kept in stock to make it only a matter of seconds to change the nipple length and provide a new control point. This is very useful where changes in the process are frequent, since it overcomes the necessity of providing multiple probes and complicated switching circuits.—*Leonard S. Patridge, Consulting Engineer, Tuckahoe, N. Y.*

Color Judged By Real Thing

At the Southern Regional Research Laboratory of the United States Department of Agriculture, dehydrated sweet potatoes have been embedded in plastic to make a much more desirable reference for judging the color of the processed product.

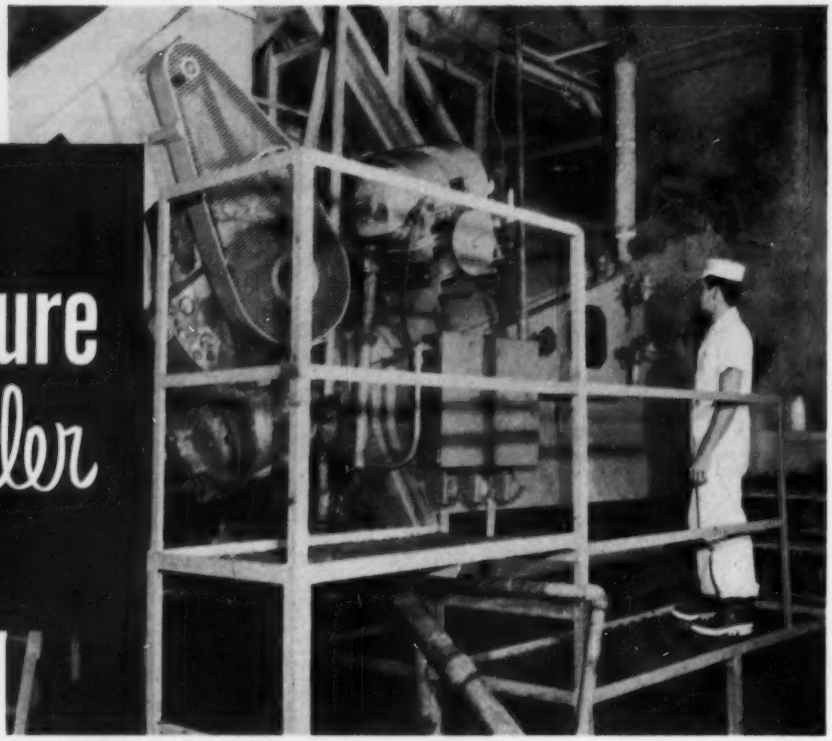
Color rating findings of instruments failed to take into consideration the human element which may decide whether or not a food product is acceptable. The sweet potato references so far have retained their color for fairly long periods even when exposed to heat and light.—*Industrial Research News Letter, Armour Research Found. of Ill. Instit. of Tech., Chicago.*



Step Ladder Supports

Two side supports give double duty where safety requires that a step ladder be steadied by one employee, while another works from the ladder. It has been found that these supports not only remove the need for having the ladder steadied, but also give the ladder a rigidness and steadiness that cannot be accomplished by having a man hold it.—*National Safety Council, Chicago (DuPont Corporation contributed).*

Hi-Pressure *steam peeler*



Typical FMC Steamer preparing fruits and vegetables for *Gerber's Baby Foods* at their Oakland, California plant.

Makes Short Work of Tough Skins

It takes an FMC Continuous High Pressure Steamer, with automatic heat penetration control, to really loosen up the tough ones. Such vegetables as carrots, beets and potatoes (certain fruits, too) are quickly and uniformly exposed to steam pressures up to 120 P.S.I.G., which make the job of skin elimination easy, fast and thorough.

Built for various capacity requirements, this machine provides a yield of 10% or more over other methods of loosening skins. As an example of output, carrots are processed at 5 or more tons per hour under 25 to 30 seconds exposure to steam pressure. In addition, there's an extremely low waste factor, there's no damage to sub-surface nutritional layers, and continuous operation reduces the manpower normally required on non-automatic lines.

Want more information? Just mail the coupon today, or call your nearest FMC representative.

Improved model boasts many features, including adjustable condensate removal unit; rigid, large diameter turret shaft; hard, smooth plate-stock liners; 1¼" heavy duty pressure-resisting firebox side plates. Built to A.S.M.E. code for up to 120 lbs. pressure.

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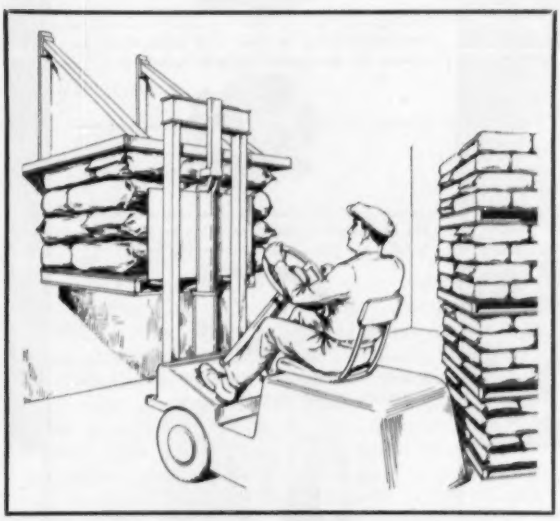
Vibrator Doubles Candy Nut-Coating

Procedure employed by Loft Candy Corp., Long Island City, N. Y., for manufacture of one of the company's popular bars was to enrobe the center with chocolate and then hand-dip and roll in a box containing chopped nuts.

This system had obvious disadvantages. Small chocolate coated bars were difficult to handle, and often slowed up the line's operation. Also, coating was usually uneven with often an excessive amount of covering or else almost none at all.

Now, chocolate enrobed centers drop from the end of one conveyor onto a layer of nuts on a conveyor beneath. Then, as the conveyor travels, the bars are covered with nuts cascaded on them at rate of 60-70 lbs. per hr. by special vibrator, a product of Richardson Scale Co., Clifton, N. J. (see photo).

Production, since vibrator was installed, has doubled, and center nut-coating is now uniform.



Waste and Safety Problems Solved

Often, a simple, low-cost device can solve a warehousing headache. That's what happened with Doughnut Mix, one of the Ingleheart bulk products which is packed in 100-pound bags for the bakery trade.

As they come from the filling machine, these bags are oval in cross section and when palletized produce a load which is somewhat uneven. When additional pallets are stacked on top of this load, it is liable to settle with the stack leaning precariously one way or the other.

We investigated several possibilities of flattening these bags individually, but we found them impractical because of high labor costs, limited floor space available, and high installation costs.

A second solution, flattening entire pallet loads, was investigated and proved very successful. The final installation, which cost $250 to construct and install, is a five foot square angle iron frame (see sketch) covered with ⅜-inch steel plate. The flattening platform is fastened to three-inch channel sections that are, in turn, bolted to the wall. It's reinforced by two 2-inch tube braces set at a 45 degree angle.

Here's how the flattening platform works.

A fork lift truck operator positions a pallet load under the steel plate, lifting the entire load until the bags are depressed by the plate. He then lowers the load and takes it to the warehouse. Flattened bags make a straight, even stack in the warehouse with a minimum of effort by the fork lift truck operator.

The operator does the flattening operation on his way to the warehouse. In fact, even though the flattening operation has been added he spends less time per pallet handled than when formerly trying to stack uneven bags.

A neater warehouse and faster stacking of pallets is not the only advantage of the new installation. It occupies a minimum of valuable warehouse space, and it has eliminated a serious safety hazard due to the leaning stacks. We have also experienced a reduction in the number of damaged bags, thus saving about $1,150 a year in material loss alone.—*Ingleheart Bros. Div., General Foods Corp., Evansville, Ind.*

X-Rays Product If Jar Breaks

To reduce breakage of glass jars on the production line and insure that no glass particles are in the product, several practical precautions are taken at Gerber.

After trying a warm water spray, then a heater, for tempering cold jars ahead of the washer, we decided to carry a week's supply in the warehouse to permit warm-up before use in cold weather.

Spring-loaded dumping boards are used to curtail break-

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Sanitary—easy to clean and keep clean, no chance for dangerous bacteria formation.

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*Positive Displacement

● The handy Waukesha P. D.* Sanitary Pump is a good friend in any food processing plant. It pumps, easily and effectively, a wide range of food products of many consistencies without damage . . . without agitation . . . aeration . . . or turbulence—a significant cost-saving advantage for any plant. By not damaging the product's cell structure, the quality and appearance of the food is preserved . . . satisfies your customers . . . protects your brand—a real profit maker.

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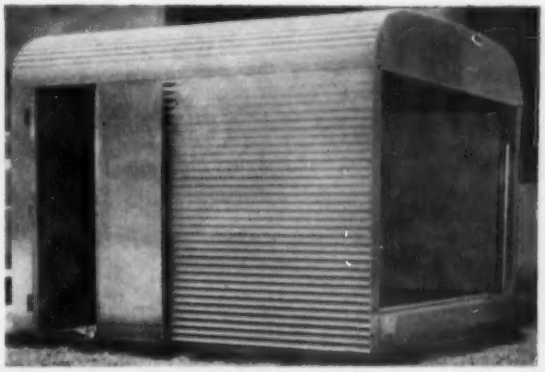
Waukesha Foundry Company

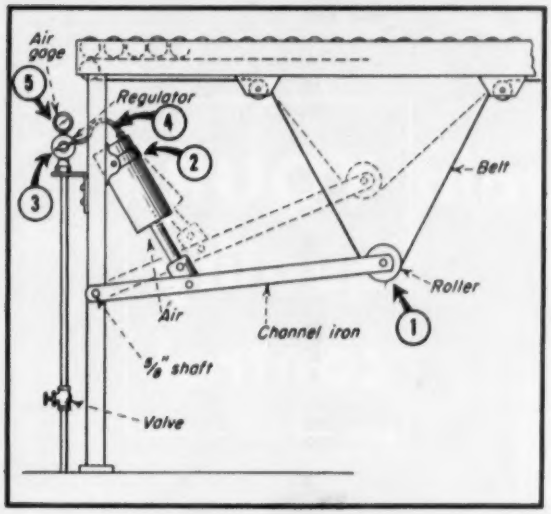
WAUKESHA—the Forward Look in Pumps. Yesterday, Waukesha Pioneered the Sanitary P. D. Pump. Today, Waukesha Pioneers the Improvements.

age when the jars are emptied from the cases. To keep dust or other particles from getting into the containers when they are dumped, jars are packed "mouth up" in the cases by the supplier.

If a jar breaks on the production line, the equipment automatically stops. Then 25 to 30 jars on each side of the "break" are removed, just in case flying glass particles may have got into them, and the line is washed down.

We also X-ray the next three retort cages of packed product on special equipment, to make certain that no container goes out with a particle of broken glass in it.—*John C. Suerth, General Manager, Engineering & Controls, Gerber Products Co., Fremont, Mich., in talk before Packaging Institute Forum.*



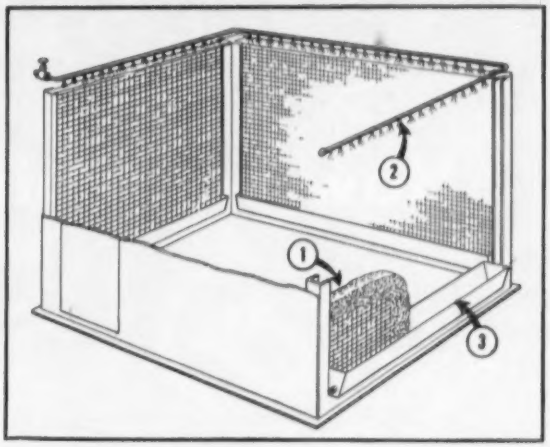


Live Conveyor Tightener

When live roller conveyor belts get damp or wet and draw up, as frequently happens in bottling plants, breakage may result. A pneumatic belt tightener we have installed in our plant assures uniform and controllable belt tension at all times and under any circumstances.

To the conveyor frame we attached arms extending to a shaft on which was mounted a belt roller—(1) in sketch—to serve as tightener. Above the arms an air-operated cylinder (2) was attached to the frame so positioned that pressure against the piston in the air cylinder thrusts downward against the belt-tightener roller-arm.

Air pressure against the air cylinder position is controlled by an air regulator (3) which is attached to the air cylinder by flexible hose (4). Preferred pressure for us is approximately 12 lb, and this pressure can be readily checked on an air gage (5).—*Thomas L. Parks, Assist. Superintendent, Coca-Cola Bottling Co., Greenville, S. C.*



Cools Plant by Evaporation

Most dairy plants, certainly in our area at least, become too hot for comfort and efficiency during hot summer months. Like ourselves, others no doubt have tried many things to reduce plant temperature.

One thing we tried in the past was to move hot air out of the plant and draw fresh air in, employing large exhaust fans either of the squirrel-cage or bladed types. Although room air was thereby freshened and the situation somewhat relieved, temperature was not reduced. And, of course, dust was introduced with the outside air.

Refrigerated air conditioning was considered but proved impractical because of large areas to be cooled in different departments. And, during summer months, even without plant cooling, we like most plants, load our refrigeration compressors to capacity.

Now in the area where our plant is located, evaporating type coolers have been in common use for many years. In fact, many families have installed them in their homes with satisfactory results. They have long been accepted as an inexpensive tool, since the only operating cost is a small

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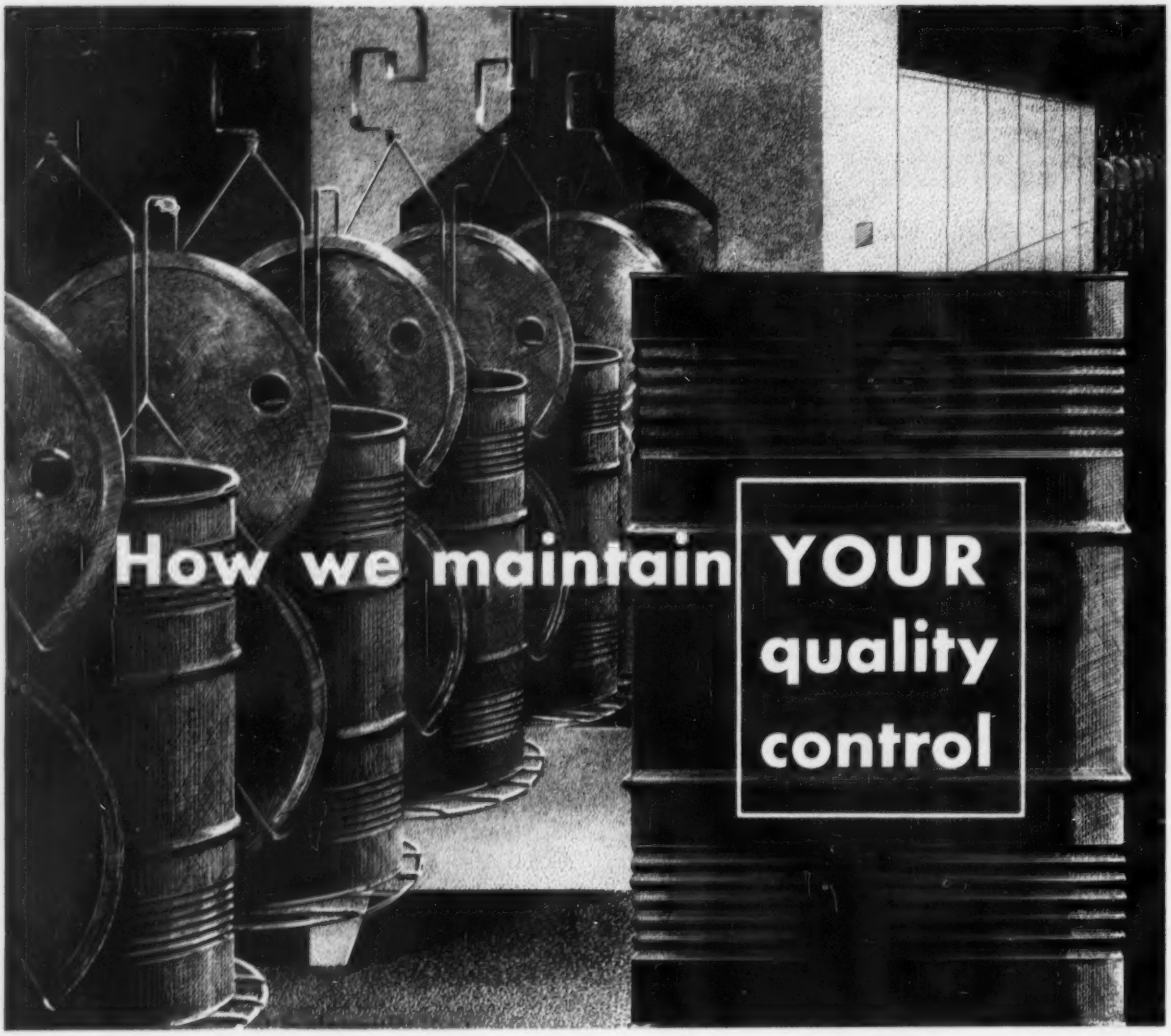
JANUARY PRACTICAL IDEA WINNER was "Common Sense Insect Trap," sent in by M. Graham, Assoc. Prof., Clemson Agricultural College, Clemson, S. C.



Every USS Steel Drum goes through three careful steps to make certain your product arrives at your customer's door as pure as it left your plant.

All surfaces of the drum body, head, and bottom are completely descaled, then purged with a strong alkali solution, removing all traces of dirt and grease. With the interior and exterior now immaculately clean, the drum is ready for a thorough coating with a special phosphate formula that means long-term freedom from rust. Each of these steps is vitally important to quality-controlled shipping. They mean that nothing will happen to your product during shipment or storage that could nullify the results of your own rigid quality control measures during manufacture.

USS Steel Drums are available in sizes from 2½ to 110 gallons, either plain or decorated. If yours is a special case . . . we have a wide variety of fittings and openings that are sure to meet your individual requirements.

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USS STEEL DRUMS

UNITED STATES STEEL

motor to operate a fan. Of course, with this type cooler the temperature of the resulting air is not really low. However, if all air in a room, house, or plant is replaced by even slightly cooled air, the area becomes greatly improved comfort-wise in a short time.

Here's how our cooler was constructed.

A box-like structure was fabricated of aluminum (see photo), 6 ft. x 6 ft. x 4½ ft., closed on one side and on top. Remaining three sides were fabricated to form 4-in. thick, loose-packed pads—(1) in sketch—made of spruce excelsior between open mesh hardware-cloth walls.

On top of excelsior pads was looped a U-shaped length of ¼-in. copper tubing (2) perforated every inch on the under side with very small holes for spraying water onto the excelsior. The flow of water is valve regulated.

Beneath the wood fiber pads, which form three sides of the enclosure, troughs (3) were constructed for collecting any water drained from the pads. Excess water collected here is re-used to minimize operating costs. By means of a liquid level control, a small pump is started to return collected water to the system.

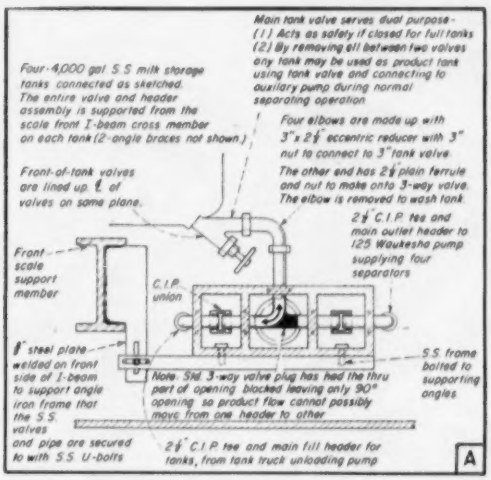
One or more of these evaporative coolers is placed and sealed on the roof of the plant. It discharges cooled air down through an opening in the roof.

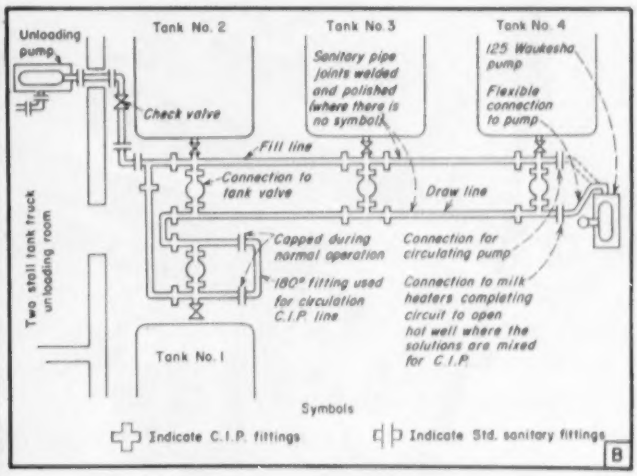
Blower we employ for drawing air through the three wet excelsior sides is a squirrel-cage type driven by a 1½ hp. motor. It delivers cooled air at the rate of 12,000 cfm. Blowers produce a slight positive pressure, so it is advisable to provide adequate venting through doors, windows or other openings allowing cooled air to move freely to all parts of the plant.

All incoming air is washed, and the unwashed outside air is kept out of the plant, thus minimizing dust.

In our area of low humidity the system works very well —holding temperatures in the 80s. Even on days of high humidity with temperatures over 80, it is still a great help.

Our workers provide ample proof of the value of the cooling system. Now, they are glad to stay inside where it is cool, rather than duck out for relief as they did before. Frequently, going into the building from outdoor heat has even felt a little chilly to me.—*C. M. Bilden, Assist. Manager, Gold Spot Dairy, Inc., Enid, Okla.*


Four-4,000 gal. S.S. milk storage tanks connected as sketched. The entire valve and header assembly is supported from the scale front I-beam cross member on each tank (2-angle braces not shown)
Main tank valve serves dual purpose- (1) Acts as safety if closed for full tanks (2) By removing ell between two valves any tank may be used as product tank using tank valve and connecting to auxiliary pump during normal separating operation
Four elbows are made up with 3" x 2½" eccentric reducer with 3" nut to connect to 3" tank valve. The other end has 2½ plain ferrule and nut to make onto 3-way valve. The elbow is removed to wash tank
Front-of-tank valves are lined up ℄ of valves on same plane.
2½" C.I.P. tee and main outlet header to 125 Waukesha pump supplying four separators
Front scale support member
C.I.P. union
⅜" steel plate welded on front side of I-beam to support angle iron frame that the S.S. valves and pipe are secured to with S.S. U-bolts
Note: Std. 3-way valve plug has had the thru part of opening blocked leaving only 90° opening so product flow cannot possibly move from one header to other
S.S. frame bolted to supporting angles
2½" C.I.P. tee and main fill header for tanks, from tank truck unloading pump
A


Unloading pump
Tank No. 2
Tank No. 3
Tank No. 4
Sanitary pipe joints welded and polished where there is no symbol
125 Waukesha pump
Flexible connection to pump
Check valve
Fill line
Connection to tank valve
Draw line
Two stall tank truck unloading room
Capped during normal operation
Connection for circulating pump
180° fitting used for circulation C.I.P. line
Connection to milk heaters completing circuit to open hot well where the solutions are mixed for C.I.P.
Tank No. 1
Symbols
Indicate C.I.P. fittings
Indicate Std. sanitary fittings
B

CIP Angles for Milk Handling

Formerly, our four raw-milk storage tanks were filled by an overhead line located some 10 ft. above the floor—a pipe arrangement that proved a costly as well as confusing and hazardous job to take down, wash, and reassemble.

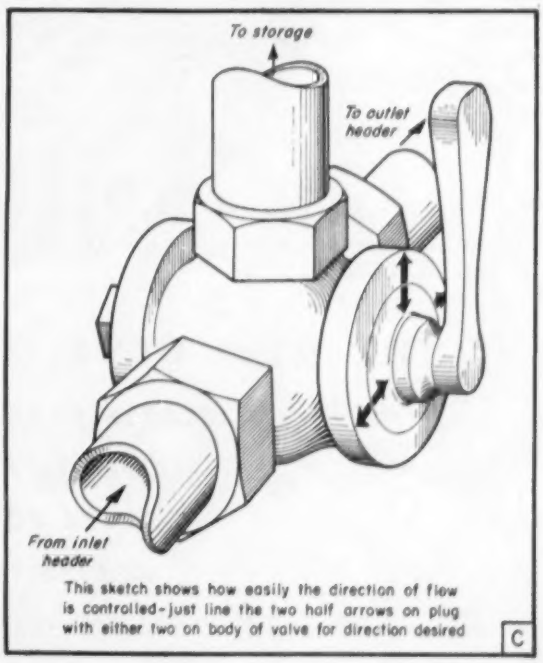
Furthermore, there frequently were troublesome leaks. Then too, the overhead structure of the pipes caused excess foaming in the tanks.

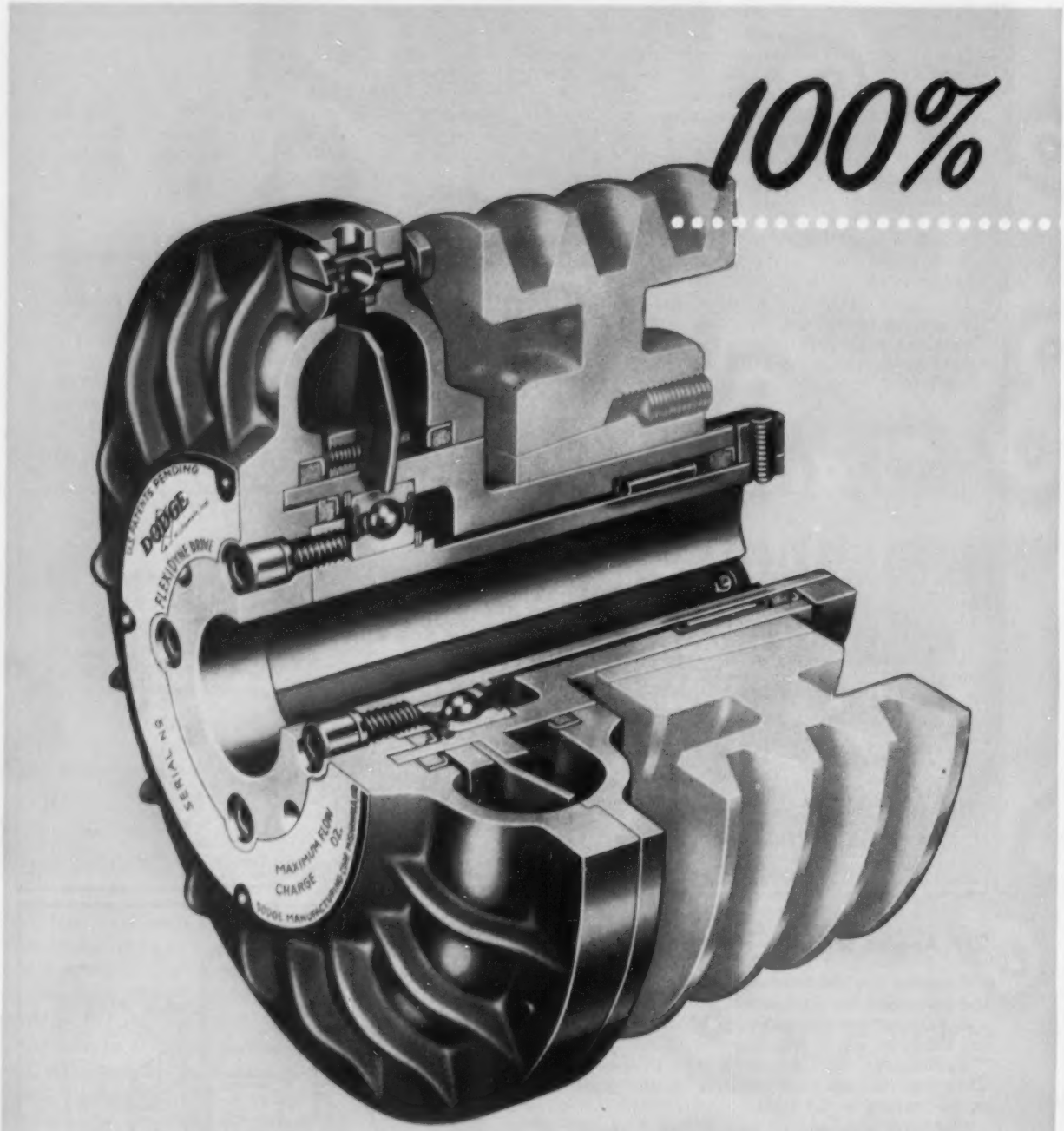
Our newly installed CIP lines (Sketch A) are welded to one another and are supported from the scale beams only. Thus they do not interfere with tank weights.

Both headers (Sketch B) have 15 in. of clearance from the floor for easy washup. Furthermore, the headers, valves, etc., are assembled with clean-in-place unions, except for elbows connecting the three-way valves to the tank valves. These have to be removed for tank washing.

To avoid errors, three-way valves are arrow-marked (Sketch C) on core and case so that flow direction is always obvious.

The ends of the headers have regular threaded ferrules for easy connection of the 180-deg. elbow and recirculating lines, and further these new headers, wherever possible, have welded joints that eliminate many fittings and unions. —*Hubert Fiske, Plant Manager H. P. Hood & Sons, St. Albans, Vt.*


To storage
To outlet header
From inlet header
This sketch shows how easily the direction of flow is controlled-just line the two half arrows on plug with either two on body of valve for direction desired
C



THE NEW DEVELOPMENT THAT

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— PROTECTS AGAINST SHOCKS AND OVERLOADS

— SAVES POWER

— GIVES 100% EFFICIENCY AT FULL LOAD

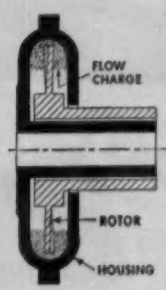
Efficiency at Full Load!

FLEXIDYNE

THE DRY FLUID DRIVE

Field experience proves that the new principle employed in Flexidyne provides a better way to handle difficult drive problems.

The "dry fluid" in Flexidyne is heat treated steel shot. A measured amount, called the flow charge, is contained in the housing, which is keyed to the motor shaft. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, wedging it between the housing and the rotor which transmits power to the load.



After a momentary slip between housing and rotor the two become locked together and achieve full load speed without slip and at 100% efficiency during the running cycle.

Flexidyne is easy to select *off the shelf.* Each size has a standard horsepower rating, yet the flow charge can be varied quickly to give you tailor-made torque to suit the job.

Write for bulletin A-640, or call your Dodge Distributor now about Flexidyne Drives and Flexidyne Couplings.

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CONVEYORS
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COTTON CARDS
"Finally . . . the soft start!"

TRAVELING CRANES
"Spots our loads . . . and how!"

PUMPS
"Now we are using smaller motors, too!"

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"Takes off smooth as silk!"

. . . AND OTHER HEAVY INERTIA LOADS
"Wonderful performance!"

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone book, or write us.

DODGE
of Mishawaka, Ind.

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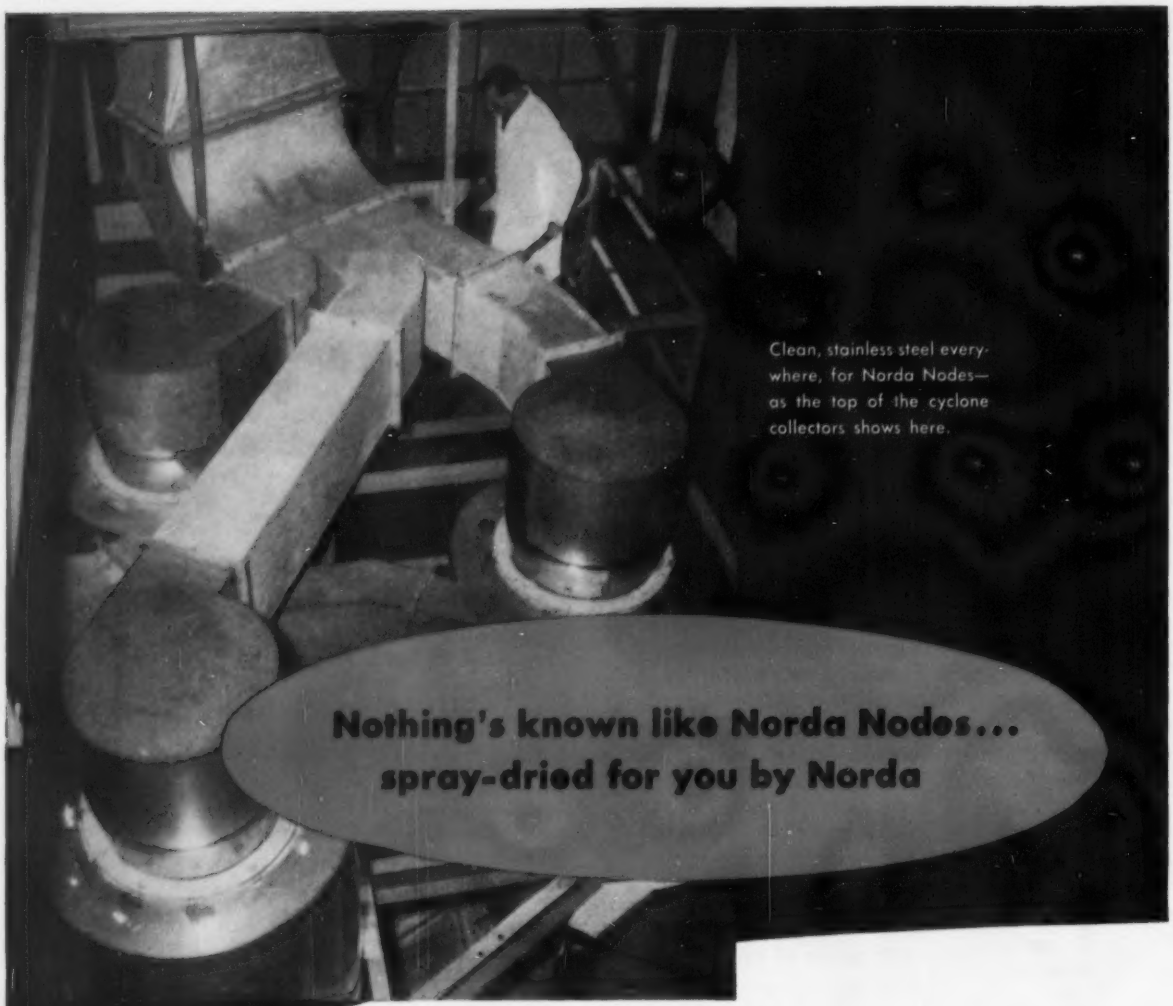

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Nothing's known like Norda Nodes... spray-dried for you by Norda

Does Norda know more about making superior spray-dried flavors for you than anyone else in the business?

Let quality answer that question. Test Norda Nodes yourself.

Norda Nodes are spray-dried flavors produced with great efficiency in a plant considered a model of the best in modern spray-drying.

Norda Nodes insure your mixes long-lasting, *in-grown*, pure fruit flavor, because the true, original Norda Flavors have been *in-blown*, locked in colloid-coated minute Norda Nodes—flavor "buds"—and cannot escape until liquids are added. The rich, real flavor you put in your product reaches the user unchanged.

Send on your letterhead for *free samples* of Norda Nodes.

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DESIGNED FOR LIGHT, FREE-FLOWING MATERIALS. Has welded steel, dust-tight casings.

Boot shaft furnished with-gravity takeups on elevators having 50-foot centers or more. Elevators have steel buckets mounted on belt. Curved hood is designed for proper discharge of material.

FOR LIGHT, FRIABLE OR SLUGGISH MATERIALS. Buckets mounted on double chain strands.

POPULAR FOR A RANGE OF MATERIALS. Has fixed head shaft, screw type boot shaft takeup.

FOR CRUSHED MATERIALS with lumps less than ½". Fixed boot shaft, adjustable head shaft.

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provide maximum efficiency in a
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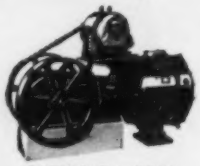
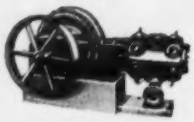


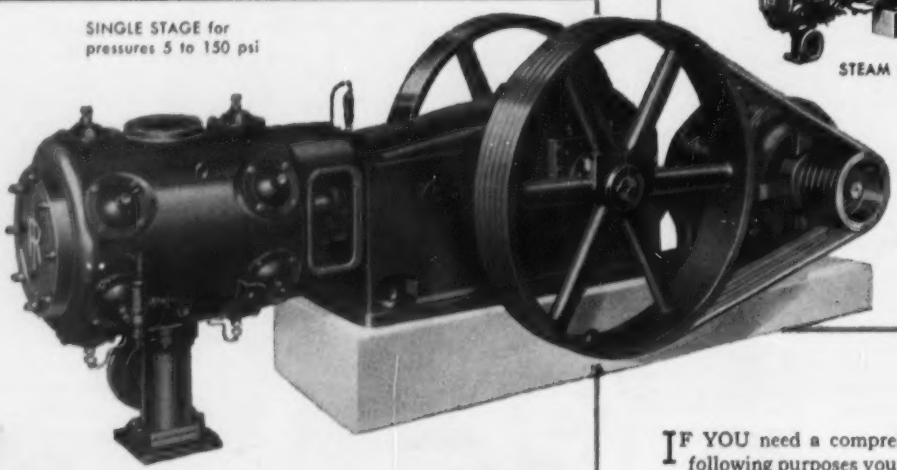
OVERHEAD MOTOR



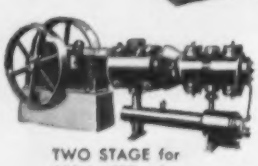
DIRECT-CONNECTED SYNCHRONOUS MOTOR

STEAM DRIVE

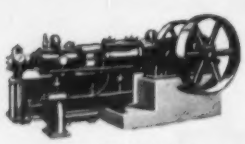
SINGLE STAGE for pressures 5 to 150 psi



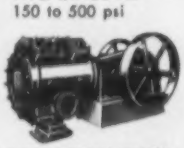
V-BELT DRIVE



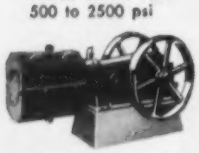
TWO STAGE for 150 to 500 psi



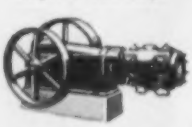
THREE STAGE for 500 to 2500 psi



DRY VACUUM PUMPS . . . single or two stage



STEAM-PRESSURE BOOSTERS



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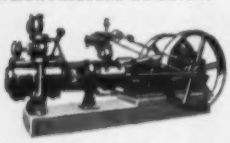

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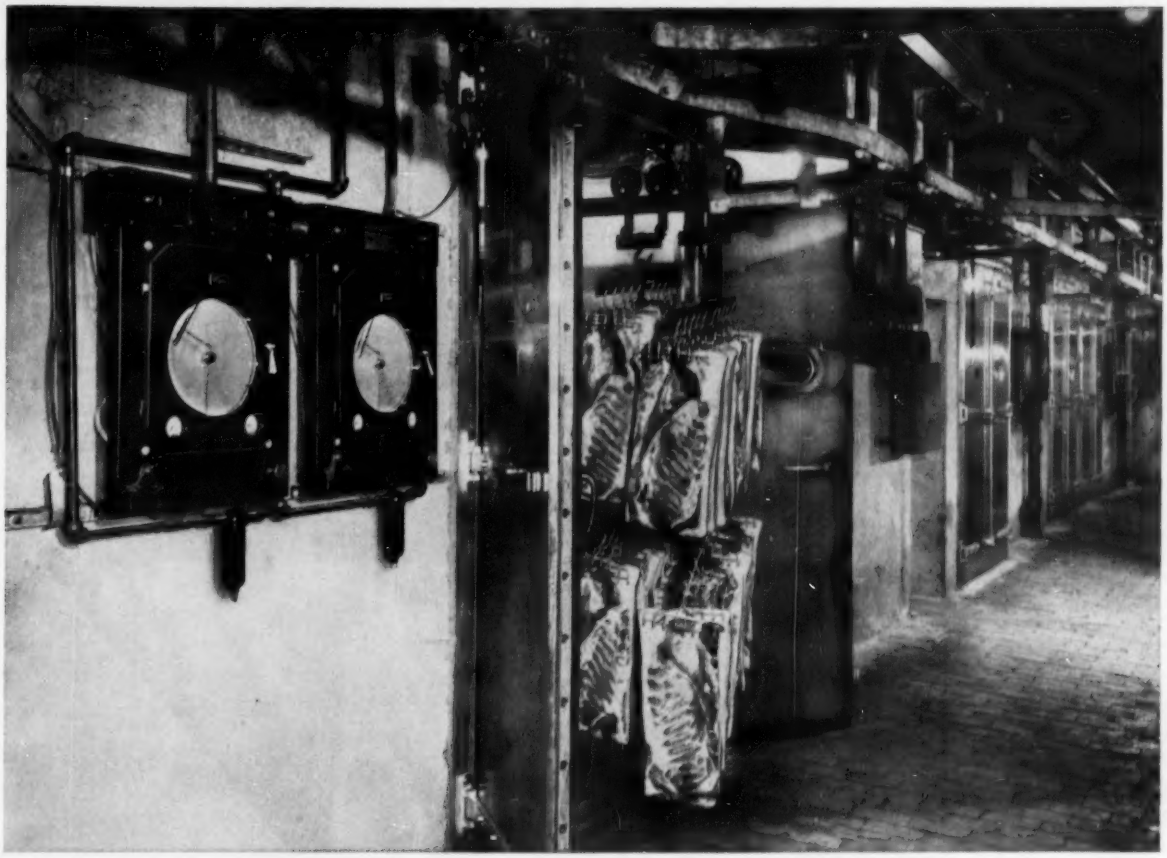

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THROUGHOUT its marketing area the name Arpeako means the finest—in hams, bacon, smoked pork loins and sausages. At the Rochester, N. Y., plant of Tobin Packing Company this reputation is jealously guarded by strict quality control at every step. In the 8 new Julian air-conditioned smokehouses for example, required temperatures are precisely held by Taylor Controllers.

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A Taylor FULSCOPE* Recording Wet-and-Dry-Bulb Controller maintains the desired moisture content of the air in each house. Two diaphragm valves are used, in the steam heater supply line and on the steam spray line. A MOTOSTEEL* Lever Motor is automatically operated by the controller to open and close the fresh air intake and exhaust vents. Smoke density is regulated by dampers in the ducts from smoke unit to smokehouse.

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Just arrived... new champs of the lightweight and middleweight haulers! New Chevrolet trucks bring you higher capacities, new hour- and dollar-saving power and performance—plus new and exclusive Task-Force features!

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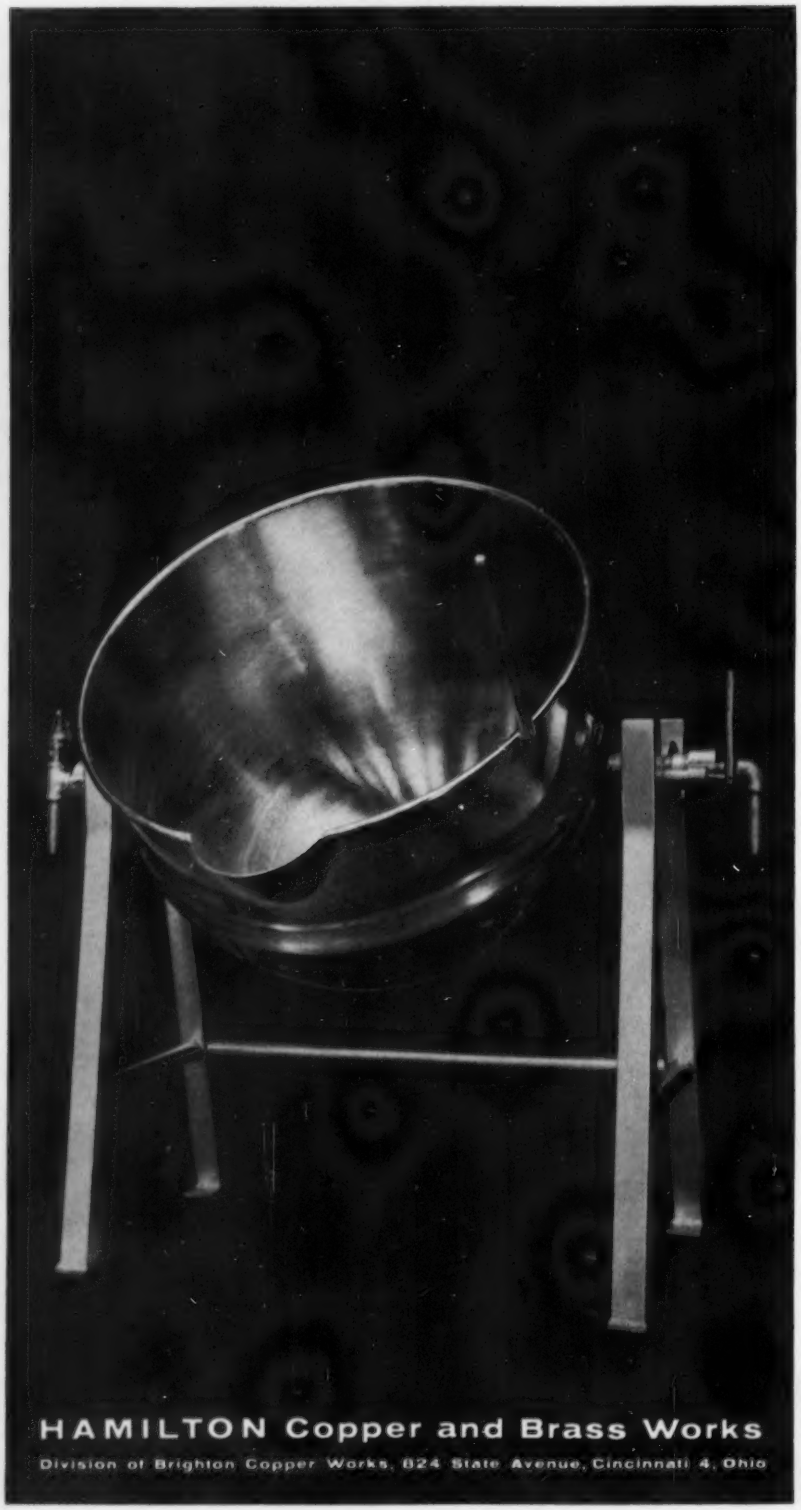
HAMILTON

New Style **C** *Tilting Kettle*

Demands for fast delivery pose no problem at Hamilton. Realizing that last minute changes in our customers' production schedules create an immediate need for additional equipment, we carry most of our standard kettles and mix cookers in stock—ready for prompt shipment.

One of our standard items is the new Hamilton Style C Hand Tilting Kettle with positive-lock tilting device. Made of stainless steel, full two-thirds jacketed. 20 to 60 gallon capacities. Kettle design provides fast, even cooking. New streamlined leg construction gives maximum support and eliminates crevices where trouble-breeding dirt and food particles normally collect.

Other types of equipment readily available include mix cookers, pressure cookers, vacuum kettles. When you need a kettle *quick* call, wire or write Hamilton—for prompt estimate and delivery information.



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Division of Brighton Copper Works, 824 State Avenue, Cincinnati 4, Ohio

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Vanillin... of the very highest quality, Shulton Vanillin, U.S.P., is controlled throughout its manufacture to rigid flavor standards, and is highly recommended for foods and beverages of superior quality.

Vanitrope*... a proven economy standard, 25 times stronger than vanillin, yet saving you up to 50% in flavor costs, is ideal for enhancing flavor, its rich, sweet aroma being remarkably like that of the freshly-cut, cured vanilla bean.

Vanillin & Vanitrope*... the finest vanilla-type flavor ingredients you can buy, work well together, or alone, and can easily be incorporated into your formulas.

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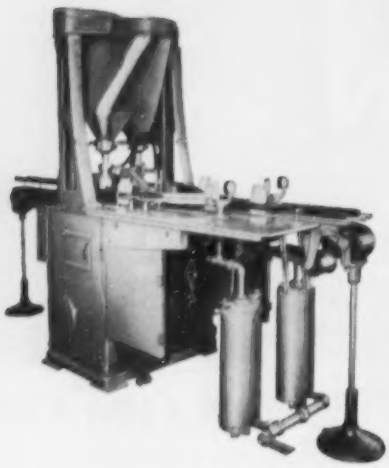
with accurate dust-free filling

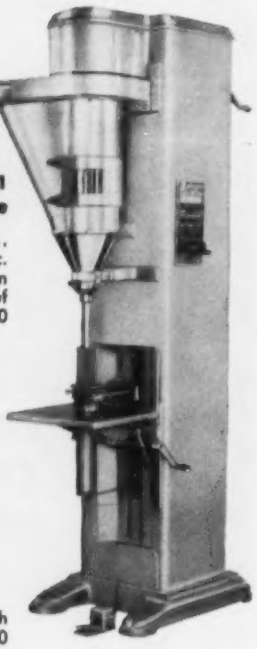
1

Stokes & Smith Model EG-1
Universal Auger Filling Machine



Semi-automatic operation with any of four filling methods... volumetric, pressure packing, gross weighing, or Auger-Vac. 40% fewer working parts are all located above filling station for clean operation. Will accommodate a wide range of package sizes from 2 grams to 10 lbs. at speeds up to 30 units per minute.

Ideal for Dry Milk Solids



Stokes & Smith Auger-Vac assures clean, accurate fill with minimum dusting loss of whole or non-fat dry milk solids, hot chocolate powder, cocoa, instant coffee, etc. in cans or jars.

2

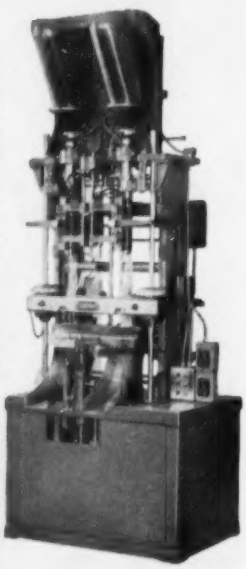
Stokes & Smith Model HG-84
Automatic Duplex Filling Machine

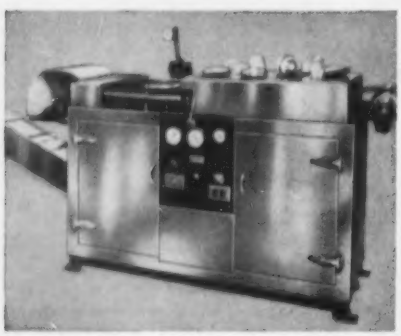
Two filling stations operate automatically by auger feed with precision cam-control for accurate filling. Speeds up to 60 units per minute. Also supplied with Auger-Vac equipment for fast, dustless filling of non-fat dry milk solids and other hard-to-pack powdered products.

with fast, flexible packaging

3

Stokes & Smith Model "B5"
STOKESWRAP Machine





From roll stock, automatically forms, accurately fills a wide range of powdered or granular products and heat-seals either pillow-type or four-seal package. Handles a wide variety of packaging films at speeds up to 120 units per minute. Ask about STOKESWRAP for non-fat dry milk solids, dry cream, etc.

with contour wrapping

4 **Stokes & Smith STRETCHRAP Wrapping Machine**

Cheeses, meats and other odd-shaped products are wrapped at speeds of 12 or 15 units a minute in clear, sanitary, air-tight Pliofilm.* Reduces spoiling, handling damage, moisture loss. Tight wrinkle-free "skin" makes sales-appealing package.

**T.M. The Goodyear Tire and Rubber Co., Akron, Ohio*

See them at the Packaging Show—Booth 341

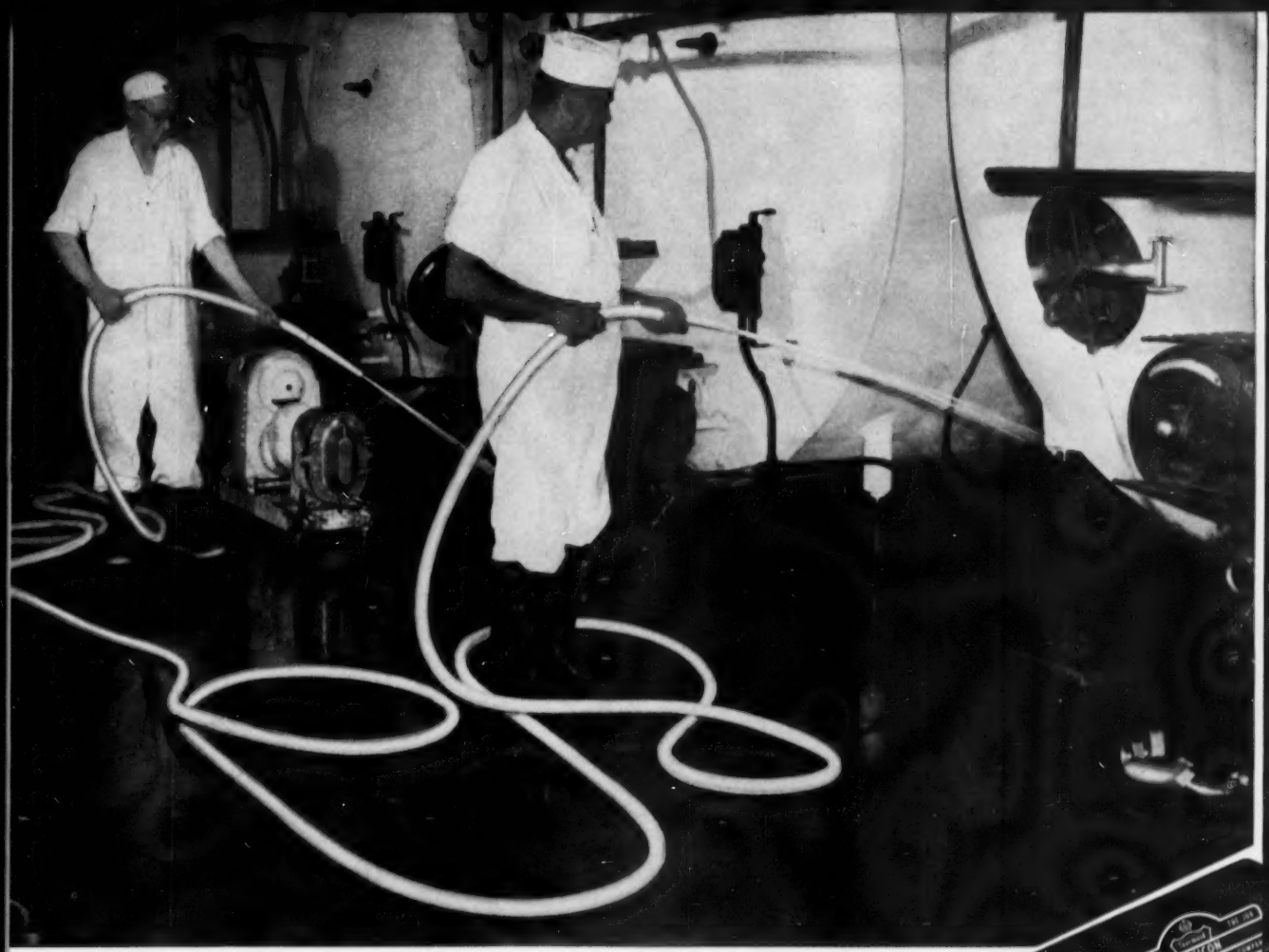
STOKES & SMITH CO.

4914 - M SUMMERDALE AVENUE, PHILADELPHIA 24, PA.

Pacific Coast: SIMPLEX PACKAGING MACHINERY, INC., 534—23rd AVE., OAKLAND 6, CALIF.

fmc

SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION



Thermoid Hose designed specifically for use in food processing plants

Thermoid designs and manufactures many types of hose for a wide variety of specific industrial applications. These 3 are ideal for use in food and beverage plants:

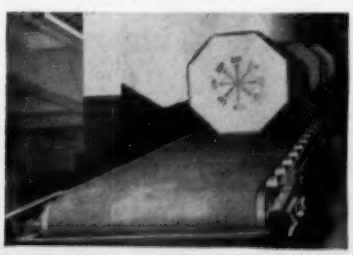
VERSICON most versatile hose ever developed. Handles air, water, oil, gasoline, dilute acids and gases.

CREAMERY for use with hot or cold water and low pressure steam, for cleaning and sterilizing.

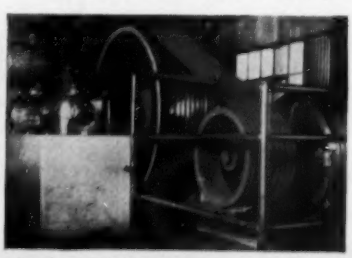
BREWERS for use in breweries, wineries and food plants. Imparts no taste or odor.

Your Thermoid Distributor carries a full line of Thermoid Hose, Conveyor Belting and Multi-V Belts to meet your most exacting requirements. He maintains complete stocks and can give you fast service. If you prefer, write direct.

Cut costs with Thermoid Conveyor Belting . . .

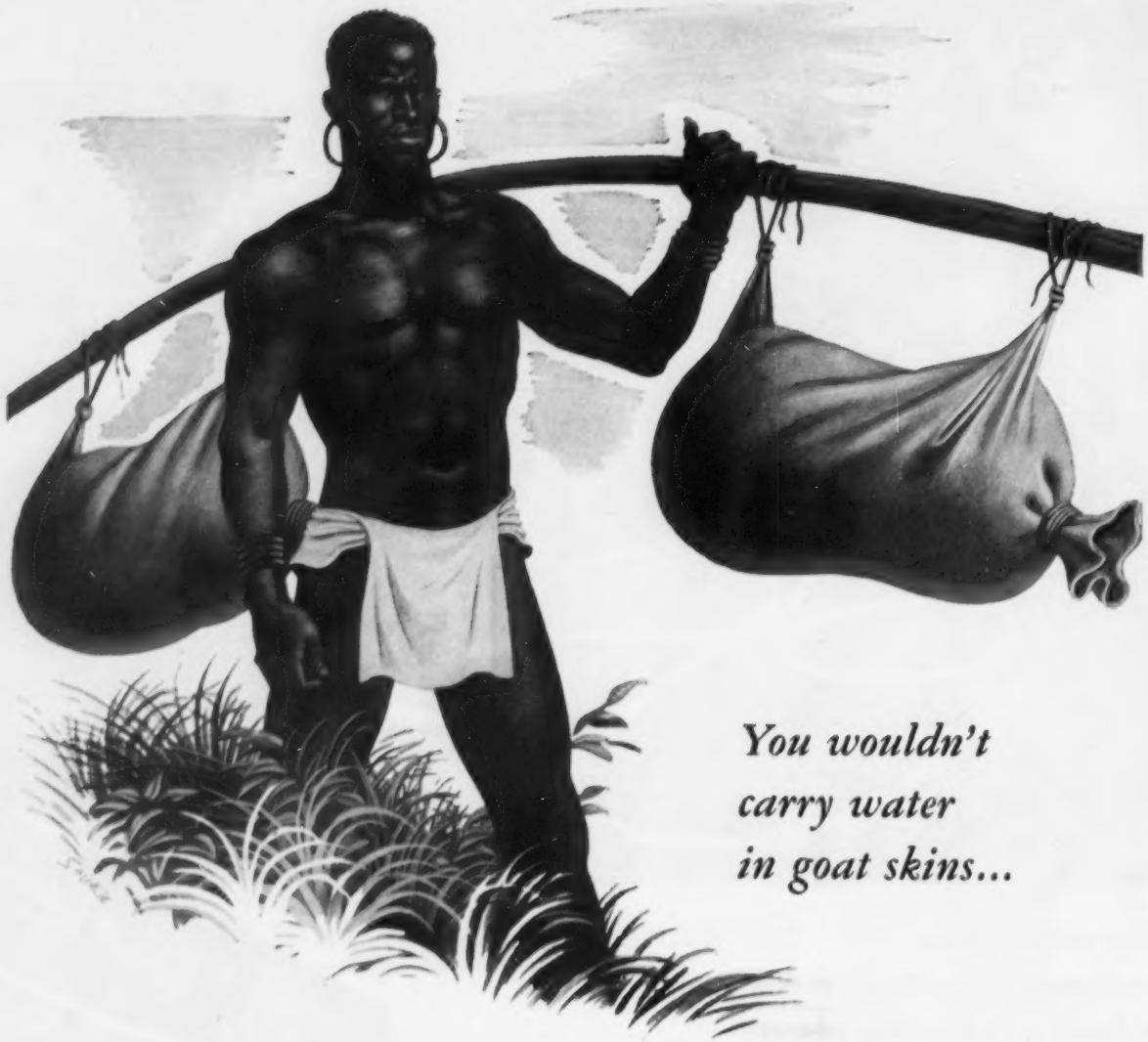


. . . and Thermoid Multi-V Belts.



Thermoid

THERMOID COMPANY, Trenton, N.J.



You wouldn't carry water in goat skins...

...so why ship liquids the old fashioned way?

SWITCH TO SHIPPERS' CAR LINE FOR MODERN TANK CAR SERVICE

Shippers' Car Line is the exclusive sales agent and lessor of the ACF-built DURADOME tank car. When you buy or lease from Shippers' you get the finest tank cars available today. What's more . . . SHPX tank cars comprise the most modern fleet in operation . . . backed by ACF engineering and a nationwide network of car repair shops to assure modern, efficient maintenance. Contact your Shippers' representative for all the details of *modern* tank car service—developed through more than 35 years experience in the leasing, operation and maintenance of tank cars for industry.

SHIPPERS SHPX CAR LINE

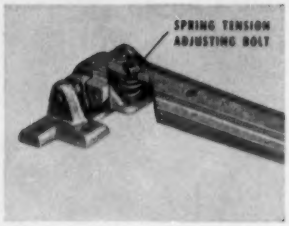
SHIPPERS' CAR LINE CORPORATION

A subsidiary of ACF INDUSTRIES, Incorporated

30 Church Street, New York 7, N. Y.

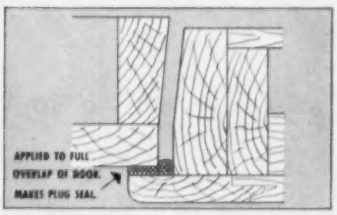
CHICAGO, ILL. • HOUSTON, TEX. • SAN FRANCISCO, CAL. • MILTON, PA. • EAST ST. LOUIS, ILL. • SMACKOVER, ARK. • TULSA, OKLA. • NORTH KANSAS CITY, MO. • RED HOUSE, W. VA.

Exclusive JAMISON features make the Series "50" the best buy in cold storage doors



Exclusive JAMISON hardware

- Adjustable hinges and fastener assure tight seal
- Rugged cast construction
- Patented heavy duty design
- Hot dip galvanized finish. Heavy zinc coating gives maximum protection



JAMISON gasketing

- Lo-Temp Gasket—soft, resilient with protective jacket
- Sillseal—flexible, abrasion and grease resistant

Box girder construction

- 5 times more rigid—prevents warping—assures tight seal
- Internal bracing eliminated—maximum insulation
- 7 times stronger—extra durability under hard service

Exclusive boat hull plywood

- Finest quality obtainable
- Water-proof plastic bond
- 7-ply front, 5-ply back panel

For complete data on the Jamison Series "50" Door write to Jamison Cold Storage Door Co., Hagerstown, Md. Ask for Bulletin #3.

JAMISON

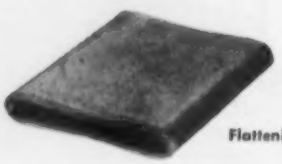
HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

CONTOUR-WELD

Flare and Flange

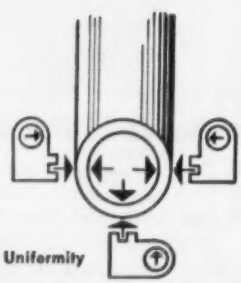
Pressure (Tubing)



Flattening

CONTOUR-WELD PIPE...BEST BY ANY TEST YOU CAN NAME

Reverse Bend (2⅜" O.D. x .154 Wall)



Uniformity

new stainless pipe

with a weld so smooth you can't even feel it

Run your finger over the weld area inside Trent's new *Contour-Welded** pipe. We doubt if you can even feel the weld. It's that smooth! There's no weld bead . . . no undercut . . . no place for corrosion or erosion to get a start.

Here's the reason: *Contour-Welding* is an entirely different method of producing welded pipe and tubing. It puts gravity to work to pull down the molten weld-metal to conform with the exact contour of the pipe. That means a smooth, clean weld practically indistinguishable from the pipe itself.

Contour-Weld Means Trent's Better Than Ever

As always, this new TRENTWELD pipe and tubing is made from uniformly rolled stainless strip. Wall thickness is always the same throughout the pipe . . . and *Contour-Welding* brings this same high uniformity to the weld zone itself. All this, plus Trent's superior cold-working methods, gives you a stronger pipe or tube, with smoother flanged or flared ends.

Try new TRENTWELD pipe or tubing on your next job. It's available in any gage, for all applications including high-pressure hydraulic lines . . . high-velocity systems . . . lines carrying corrosive chemicals. And new *Contour-Welded* tubing is available in most grades, including Hastelloy, Zirconium, Zircoloy, Titanium and 19-9-DL. You'll find that TRENTWELD can't be beat by any other pipe – welded or not.

*Contour-Weld is the trade mark of the Trent Tube Company for its process of welding pipe and tubing which is protected under U.S. Patent 2,716,692.

Why Trent's Exclusive Contour-Weld Process Means Smoother Welds . . .

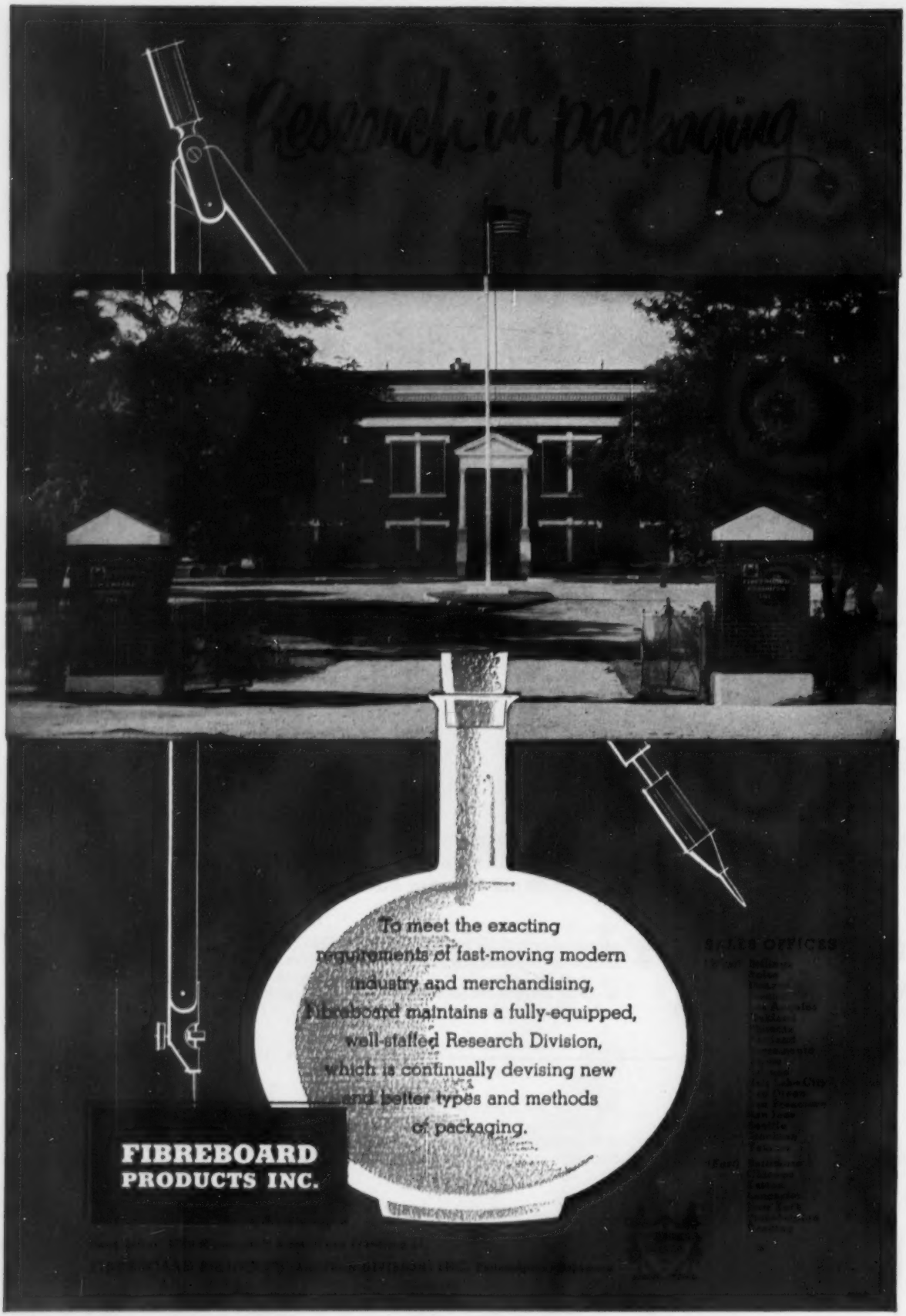
Normally, in producing welded pipe, the weld is made at the top. But gravity plays a nasty trick. It tugs at the fluid metal in the weld zone, pulling it down toward the middle of the pipe. The result, particularly in the heavier gages, is a perceptible bulge where it hurts the most – right on the I.D. surface. If you try to get rid of the bulge – at fair cost – the metal is undercut – and corrosion and erosion start there.

But Trent put a stop to that – simply by going into partnership with gravity. With their exclusive *Contour-Welding* process, they weld at the bottom – and gravity works for them. For then, the bulge is in the opposite direction – blending in perfectly with the contour of the pipe itself.

TRENTWELD **STAINLESS STEEL TUBING**

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)

For more data, circle this page number on card at back →


Research in packaging
To meet the exacting requirements of fast-moving modern industry and merchandising, Fibreboard maintains a fully-equipped, well-staffed Research Division, which is continually devising new and better types and methods of packaging.
FIBREBOARD PRODUCTS INC.

Staley's

® PRODUCTS FOR BETTER FOOD PROCESSING

BULK SWEETENER HANDLING SPEEDS PRODUCTION, CUTS COSTS

Sweetose Syrup, piped directly from your storage tanks, travels in a closed, sanitary system. A meter measures just the right amount of sweetener, then stops the flow automatically. This automatic handling system stops "man-handling" of sweeteners, improves quality control, cuts costs. See about automatic handling in your plant now.

Sweetose Syrup puts more "buy-appeal" in your brand of processed food

Tempting, balanced flavor! Appetizing color and texture! Here's "buy-appeal" at its best . . . and Sweetose can help you get it. Sweetose, Staley's enzyme-converted corn syrup, gives you *accurate sweetness control* for perfectly balanced, unmasked flavor. This easy-to-handle liquid sweetener helps *hold* fresh, natural color and texture, too . . . adding to your brand's sales-building eye-appeal. Yet with all these qualities, Sweetose is economical to use! Try it soon. See . . . and taste . . . how much *more* "buy-appeal" Sweetose adds to your processed food. See your Staley representative or write for full details.

50th ANNIVERSARY YEAR

PRODUCTS FROM CORN Staley's AND SOYBEANS

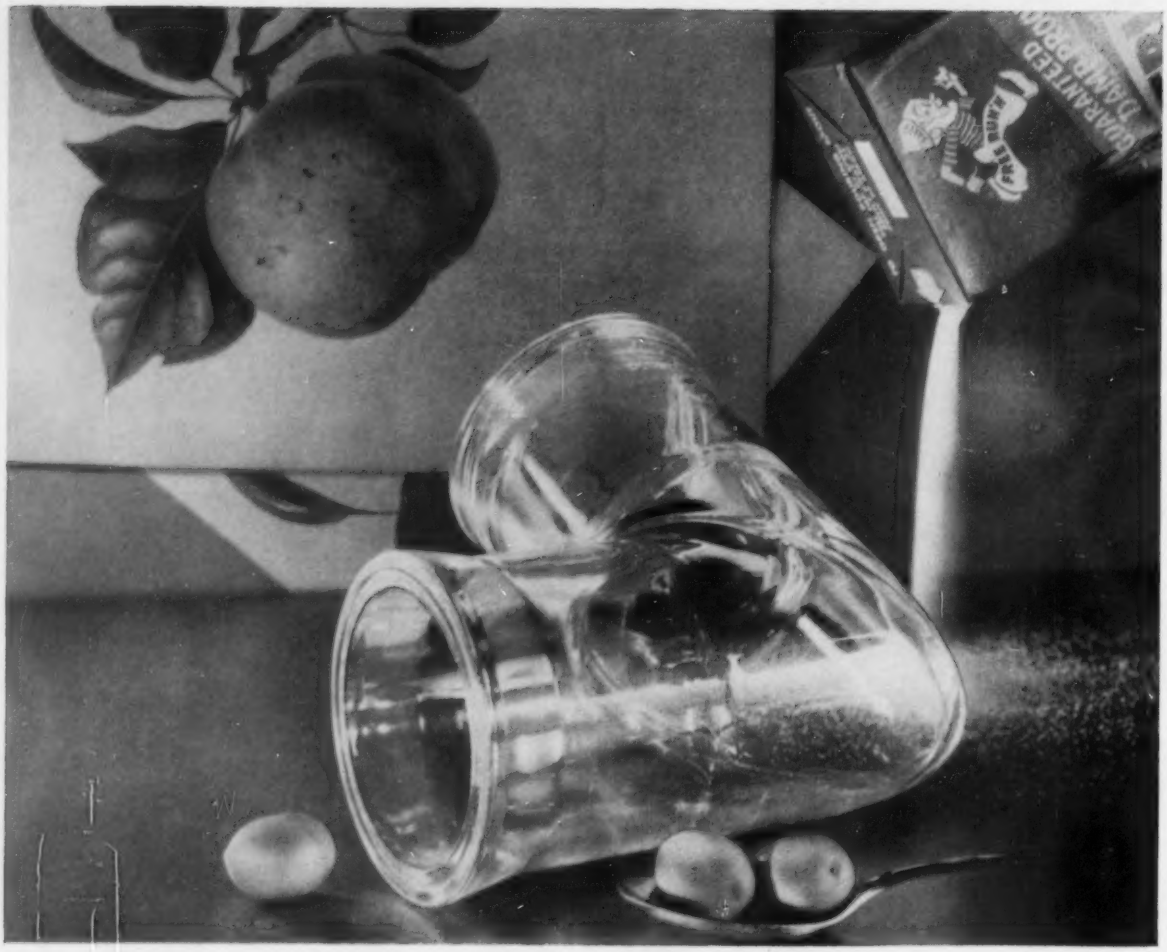
OTHER QUALITY PRODUCTS

Regular, Intermediate Corn Syrups
Canners Starches
Refined Corn Oil
Zest®, Monosodium Glutamate
Sta-Sol® Lecithin

Sweetose®
SYRUP

A. E. Staley Manufacturing Company, Decatur, Illinois

For more data, circle this page number on card at back →



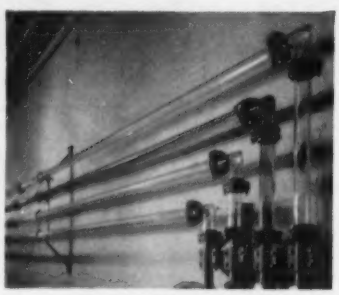
CORROSIVES . . . *but no corrosion*

This is the problem: the bitey taste and the salty flavor that make vinegar and olives so good are the same reasons they're hard to process.

One is acid, the other brine. Both delight in being tough on pipe. But not here. Not since The Kroger Co. installed glass pipe. Fruit acids and brine solutions find PYREX brand glass pipe imperturbably indifferent to their severest attack. They've been trying their worst on these lines at The Kroger Co. for as long as four years but glass pipe won't go along with them. *Kroger will never have to replace any glass because of corrosion.*

Other fruit acids, spices and corrosive ingredients have tried to eat into glass pipe in other food processors' plants for a good many years longer, with equally unrewarding results. The fact is, nothing you put in food or use to process food will corrode chemically stable PYREX brand glass No. 7740.

This is a fact best and most convincingly proved by experience. It's an experience *you* can enjoy. To learn how, send for our Bulletin EA-1 and for other interesting information.



To clean lines like these, Kroger sends a whsshshssht of low pressure steam through them. They're sanitary and ready to go without down time.

CORNING GLASS WORKS, CORNING, N. Y.
53 CRYSTAL STREET
Corning means research in Glass

Stubborn resistance to wear makes this chain a

favorite of the food industry

Pintle chains have closed pin joint to prevent entrance of foreign material. Steel pins are locked against rotation in sidebar.

LINK-BELT pintle chain also offers low cost and versatile conveying

HERE'S another popular Link-Belt chain in the food field. It's pintle chain which can be effectively adapted to many conveyors, elevators, and drives. Low-cost pintle chains are available in malleable iron or super-tough Promal with a great variety of attachments to meet your exact requirements. And consistent with Link-Belt standards, accuracy and uniformity are assured by strict control throughout manufacture.

Depend on the completeness of Link-Belt's line for the best answer to all your chain needs. From no other source can you get so broad a range of silent and roller chain . . . of cast, combination, forged and fabricated chains with mated sprockets.

Get Link-Belt chains for all your needs from your nearest Link-Belt Factory Branch Store or Authorized Stock-Carrying Distributor.

Continuous supply of corn to canning plant is achieved with the help of this flight conveyor consisting of two strands of Link-Belt No. 488 Promal pintle chain with A-42 attachments and slats spaced every 12th pitch. Conveyor is driven through Link-Belt parallel shaft gear and roller chain drives.

Looking for the BEST chain for a specific need? Link-Belt makes the complete line.

LINK-BELT

CHAINS AND SPROCKETS

19,592

PLUS A COMPLETE LINE OF MATCHING SPROCKETS

LINK-BELT COMPANY. Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W., South Africa, Springs. Representatives Throughout the World.

If you use MILK or

N.F.D.M.S.

...see how

Sweet Dairy Whey

can improve quality and reduce costs TOO!

SWEET DAIRY WHEY is an improved dairy ingredient that perfects the richness of "old-fashioned flavor" in modern food preparations. It improves color, texture, shelf-life and appearance of food products. And it can save you money too — up to 50% of your dairy ingredient costs — by replacing part or all of your present dairy solids.

If you use milk, or nonfat milk products, it will pay you to investigate Sweet Dairy Whey. It's spray dried, meets or exceeds U. S. Extra Grade standard. In addition to extensive use in the baking and meat industries, here are just a few of the ways Sweet Dairy Whey is being used to improve food products today:

Sherbet — for better control over texture, appearance, flavor. Reduces flavoring costs, too.

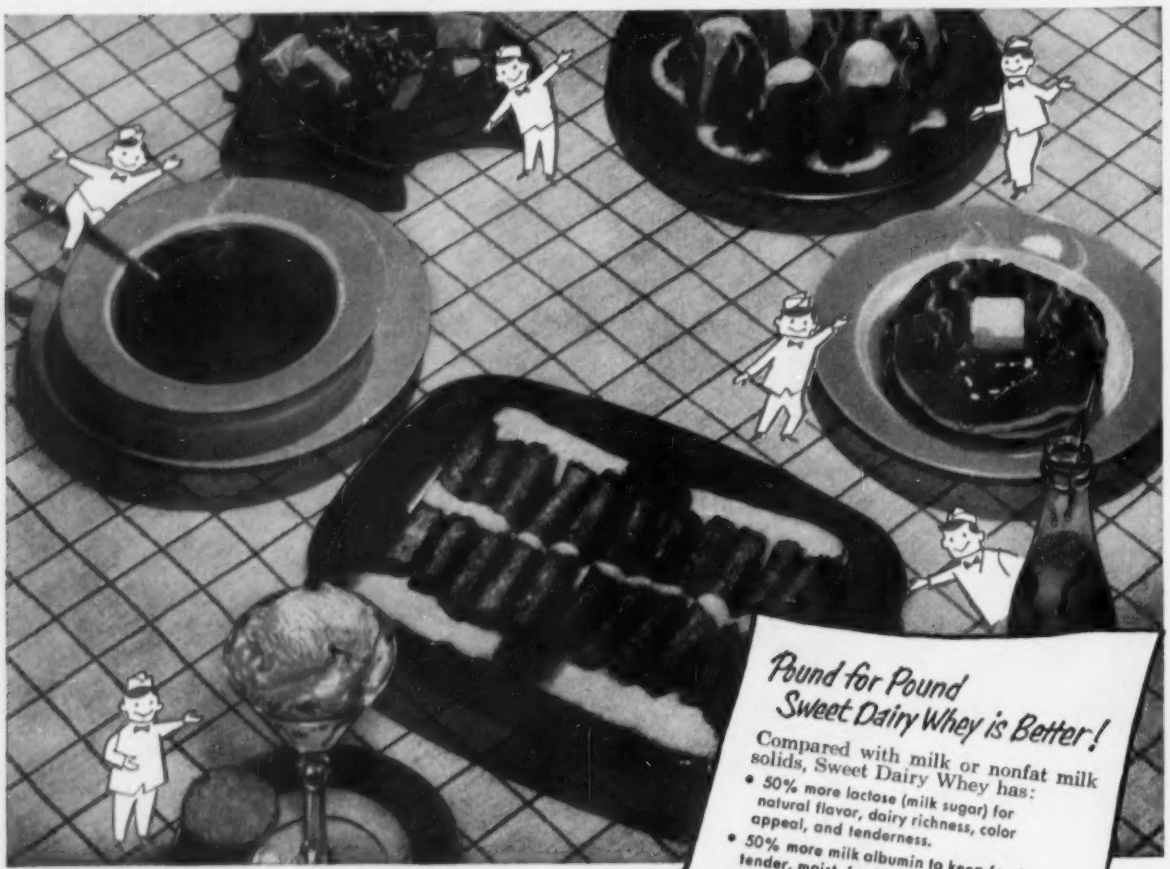
Candy — Sweet Dairy Whey preserves natural fresh flavor, texture and sweetness longer . . . provides superior eating qualities.

Cream-style foods — for smoother heavy-bodied cream soups and sauces with natural flavor. Improved reconstituting qualities.

Tomato soups — for greater heat stability, more original tomato taste and no separation before or after sterilization.

Prepared mixes and batters — for richer, golden-brown color, appealing milk flavor, and for tender, fluffy texture.

Soft drinks — for improving body characteristics in fruit juice type drinks . . . helps achieve proper "cloudiness" effect.



Pound for Pound Sweet Dairy Whey is Better!

Compared with milk or nonfat milk solids, Sweet Dairy Whey has:

- 50% more lactose (milk sugar) for natural flavor, dairy richness, color appeal, and tenderness.
- 50% more milk albumin to keep food tender, moist, fresh — longer.
- 25-50% lower cost . . . plus more of the essential milk constituents, more milk minerals and B-complex vitamins. And it's casein free!
- Uniform quality the year around. Prompt delivery.

Write Technical Service Department for additional information and working samples

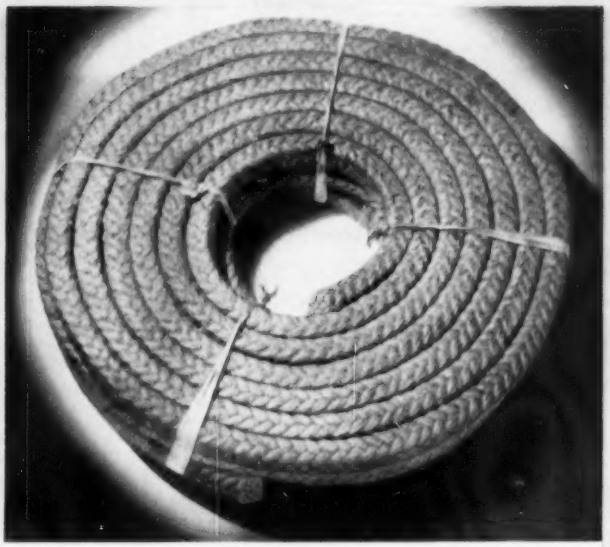
Sweet Dairy Whey

"VALLEY FRESH" PRODUCT

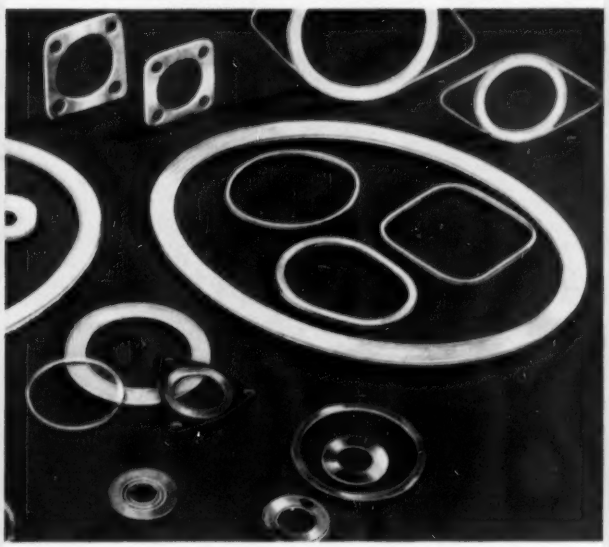
WESTERN CONDENSING COMPANY
APPLETON, WISCONSIN
World's Largest Producer of Whey Products

22 plants coast-to-coast

ROD PACKINGS AND GASKETS



U. S. White Lubricated Packing (Style #181)
FOR TEMPERATURES UP TO 150 DEGREES F.
U. S. Braided Teflon Packing (Style #135)
FOR TEMPERATURES UP TO 500 DEGREES F.



U. S. Teflon Gaskets
FOR TEMPERATURES UP TO 500 DEGREES F.

Resistant to all food chemicals

These Pump and Valve Stem Packings are specially designed for the food industry. Being chemically inert, they are non-toxic.

Specify U. S. White Packings (Style #181) for temperatures up to 150 degrees F.

Specify U. S. Braided Teflon (Style #135) for temperatures up to 500 degrees F.

These packings are available at any of the 27 strategically-located sales offices, or write United States Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, New York.

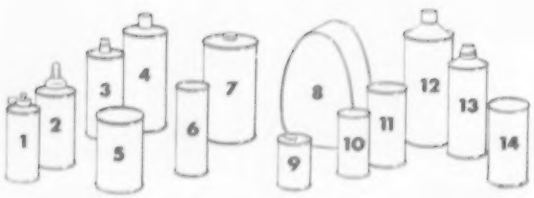
US RUBBER

Mechanical Goods Division

United States Rubber

For more data, circle this page number on card at back →

All new... all



1, 2. For Sprays, Mists or Foams—Canco's pressure containers, scientifically designed to accommodate the widest variety of valves.

3, 4. For Detergents—cans that pour freely—yet won't drip a drop . . . lightweight, easy to handle, can't break.

5. For Pet Foods—a "No-stick" enamel-lined can for easy removal of meat and fish-base pet foods.

6. For Biscuit Dough—a unique fibre container that protects completely . . . with a new pull-tab for easier product removal.

7. For Beer—a brand new stackable quart can, trade-marked "*Keglined*"—with an easier opening cap.

8. For Meats—an anodized can especially developed for those packers desiring improved processing.

9. For Grated Cheese and Powdered or Granular Products—a twist-top container that readily adjusts to "open" . . . "pour" . . . "sift" . . . or "store".

10, 11. For Frozen Concentrates—a cemented side seam container in *two* popular sizes . . . permits full lithography *all the way around*.

12, 13. For Liquid Shortenings—cans with completely dripless spouts and aluminum roll-on caps—ideally suited to many other liquid products.

14. For Soft Drinks—Canco's scientifically designed "MiraCan"* for carbonated beverages . . . unique construction and super-tight seal safeguard original flavor and full carbonation.

*T.M. AMERICAN CAN CO.

from CANCO !

WHICH of these brand new containers could *you* use for *your* product?

Every one of them is new . . . every one designed by Canco to meet certain specific requirements. Most of them were made with a certain product in mind, but most of them are readily adaptable to *other* uses.

Or perhaps *your* product requires its own special container, with special features all its own. Chances are, your best bet would still be Canco—far and away the leader in imaginative package design for customers in every field.

COME TO CANCO FIRST !

AMERICAN CAN COMPANY New York, Chicago, San Francisco

For more data, circle this page number on card at back →

Nash Compressors are Built for Long Life and Constant Performance

It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

312 WILSON, SO. NORWALK, CONN.

ONLY GOOD FLAVORS can make these products *tastier than they look.* Pickle processors know from long experience that dependable year in, year out uniformity and super-quality of FRITZSCHE'S SPICING OILS is the one thing that contributes most to the appetizing goodness of their finished products. Remember: *Your product is* ONLY *as good as its* FLAVOR!

For informative data on PICKLE spicing or any other specific food or beverage flavoring need, write our Flavor Division, Dept. FE.

FRITZSCHE *Established* 1871

Brothers, Inc.

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia, Boston, Massachusetts, *Chicago, Illinois, Cincinnati, Ohio, *Los Angeles, California, Philadelphia, Pennsylvania, San Francisco, California, St. Louis, Missouri, Montreal and *Toronto, Canada and *Mexico, D. F. FACTORY: Clifton, N. J.

From Sugar Cane to Finished Product

You'll find

CORRIGAN BULK SUGAR HANDLING SYSTEMS

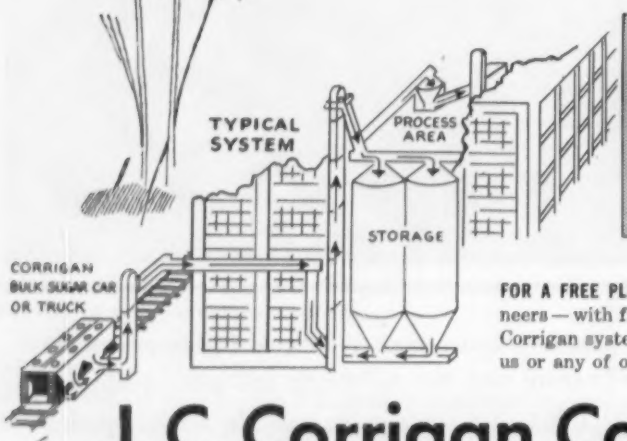
at work profitably and efficiently

In refineries—in railroad cars—in food processing plants— Corrigan's sugar systems are daily slashing materials handling costs. If your company refines and transports sugar or if you are a manufacturer using large quantities of sugar, it *will pay you* to learn why more and more companies are using Corrigan's quality engineered sugar handling systems.

Our sugar systems are at work in:

14 refineries located in the United States, Canada, Manila, Cuba and Puerto Rico;
70 condensation-proof railroad cars (Corrigan designed and patented); and in
55 food processing plants, representing 15 different types of industries.

One important reason why more companies are selecting J. C. Corrigan Co. to design, manufacture and install their sugar systems is our broad and successful experience in this field for a diversified list of America's "blue chip" companies.



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FOR A FREE PLANT SURVEY by one of our engineers—with facts and figures showing how a Corrigan system *pays for itself*—simply call us or any of our sales offices.

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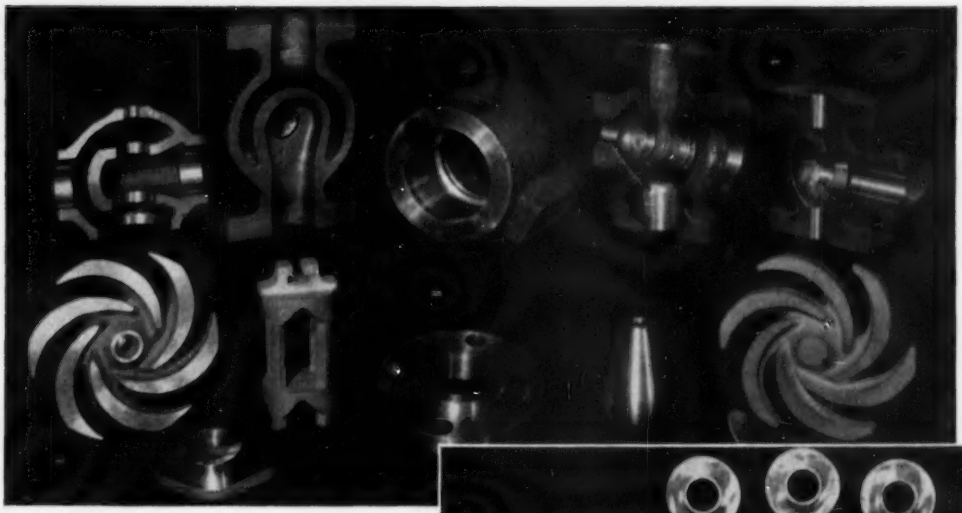

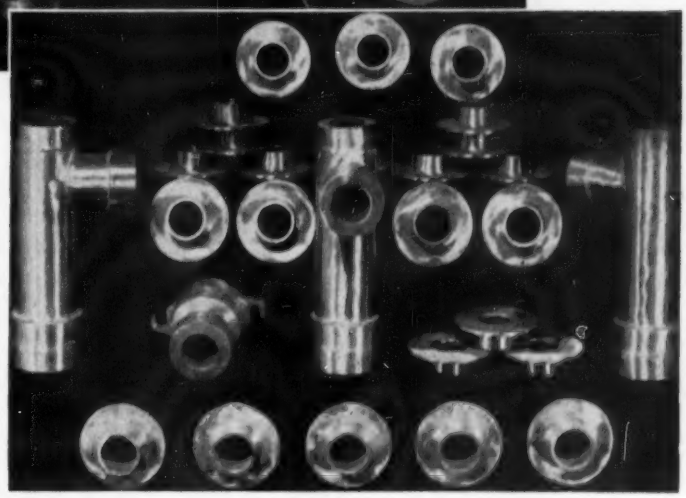

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Every stainless casting produced by our Buffalo Foundry carries the familiar "AL Star" trademark, cast into the steel. That means it's Allegheny Ludlum *time-tested* stainless steel—a pioneer that has successfully answered thousands of difficult corrosion and heat resisting problems.

It not only means experience in stainless casting applications, but in maintained high quality, too. The AL Buffalo Foundry is a pioneer in both the vertical-centrifugal and static methods of casting stainless steel. You can depend upon AL Stainless Steel Castings to be strong, clean-surfaced, sound-structured and easy-machining . . . fully in accord with the service conditions and with your requirements for delivery.

Let our stainless foundry specialists quote on *your* problem jobs—any shape casting or any size, up to thousands of pounds. ● *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pennsylvania.*

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AL STAINLESS STEEL

18 CALORIES

Surprise you that there are only 18 calories in a level teaspoonful of sugar? (Some people we asked guessed as high as 600.) You'll normally use up as many calories as you get in a teaspoonful of sugar every 7½ minutes!

PAY-OFF THOUGHT

The short, sweet message in the "box" above appears in all the big full-page newspaper and magazine ads published by Sugar Information, Inc.

It makes mighty reassuring reading to just about everybody who likes good foods and beverages. This thought pays off to everybody who makes, distributes, or sells these sugar-containing products.

It shows people that sugar contains a lot fewer calories than they may have believed. The fad for artificial, coal-tar sweeteners exists because of misinformation about sugar.

Every ad that carries the 18-calorie message runs to more than 100 million impressions. They're *good* impressions—*lasting* impressions.

Surveys show that virtually every reader remembers that a spoonful of sugar contains only 18 calories.

SUGAR INFORMATION, INC., NEW YORK 5, NEW YORK

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ADD AS MUCH AS 100% TO USABLE WAREHOUSE CAPACITY

YALE's complete line of Electric, Gas and Diesel Trucks help you get full value from every foot of warehouse space—space you *pay* for, but cannot use with ordinary storage methods. These trucks speed up the smooth flow of products in and out of your plant with less loss from breakage...less damage to containers.

And YALE's Electric Trucks won't contaminate perishables—they're odor and fume-free...operate without heat that could promote spoilage.

YALE meets every handling need in the food industry with the most complete line of industrial trucks available—in every practical capacity—with attachments to handle all types of containers: cases, cartons, drums, bags. For help in selecting the trucks that best meet *your* food-handling needs, call your YALE representative today. Or mail the coupon below.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

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Gas, Electric, Diesel & LP-Gas Industrial Trucks • Worksavers Warehousers • Hand Trucks • Hand & Electric Hoists

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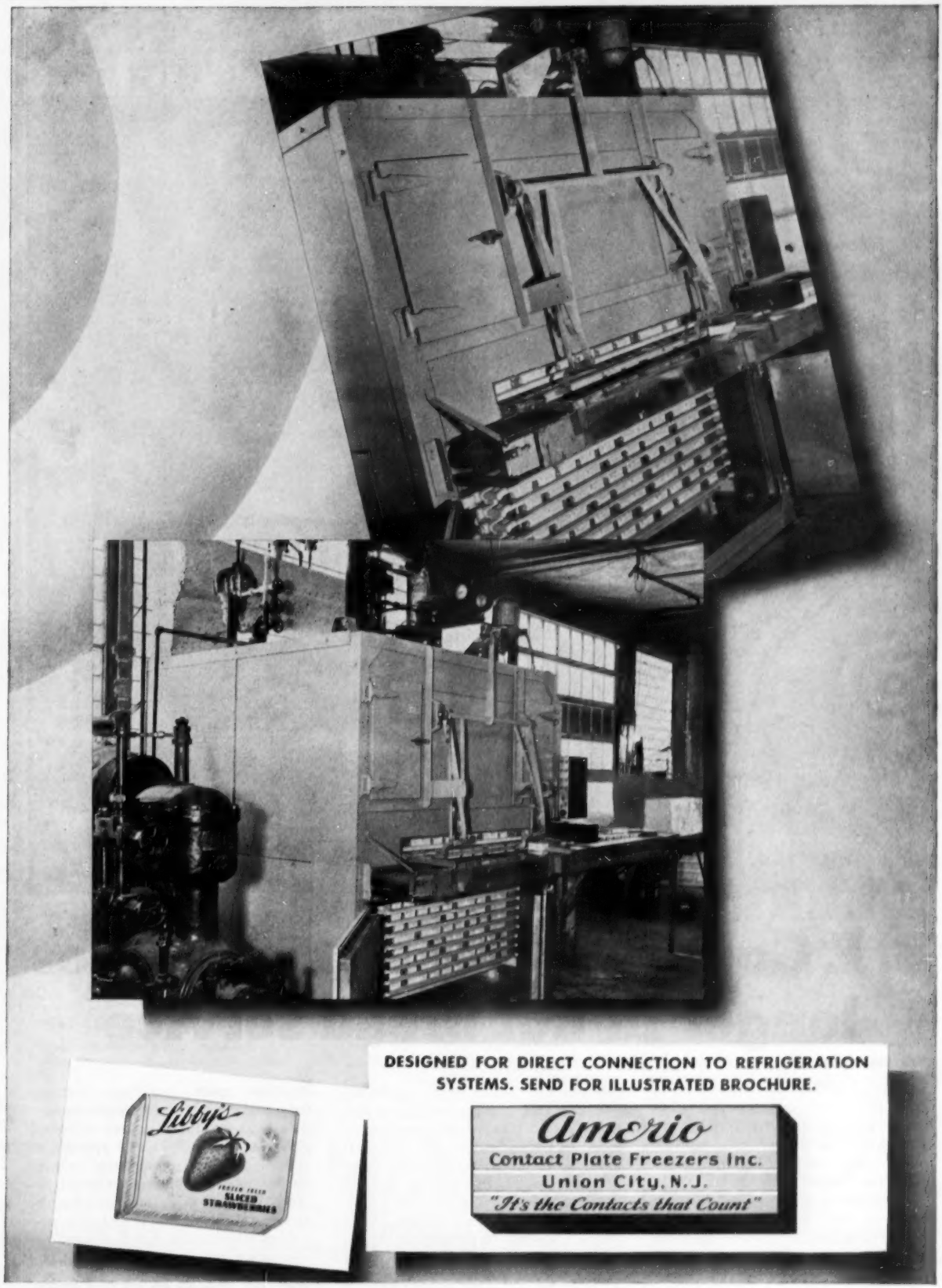

DESIGNED FOR DIRECT CONNECTION TO REFRIGERATION SYSTEMS. SEND FOR ILLUSTRATED BROCHURE.

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Contact Plate Freezers Inc.
Union City, N. J.
"It's the Contacts that Count"

METHOD OF CONSUMER AND INSTITUTIONAL PACKAGES, INCLUDING THE POPULAR 10 OZ. PACKAGES, PRODUCED FROZEN FOOD PROCESSOR.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

B. F. Goodrich belt lasted 7 times longer in hot bread service

THAT belt the bread is riding on is the most useful conveyor belt made for the food industry. It's the B. F. Goodrich Highseal, built to handle 85 out of every 100 food-handling jobs, and to last longer doing them.

In this bakery, for instance, the belts previously used on this job average only 90 days' service. The combination of oil and heat would soften the belts. Then the fasteners would pull loose, causing a shutdown for repairs at least once a week. Switching to a Highseal belt solved this problem. It's already lasted over two years—7 times longer than previous belts—and is still going strong.

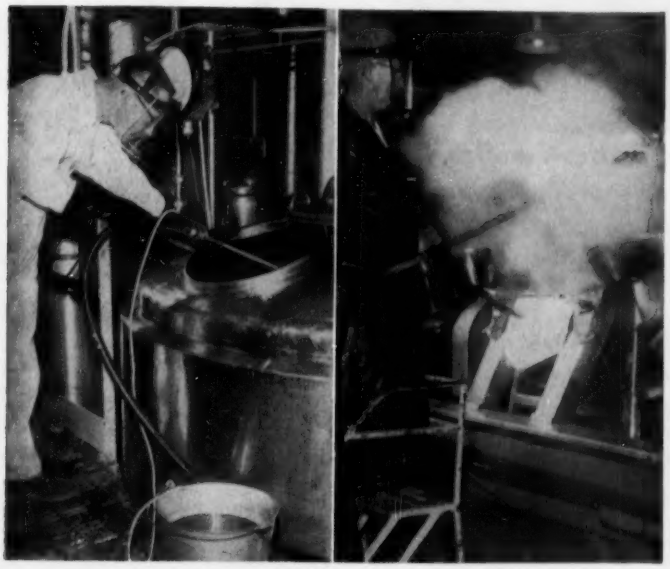
A new rubber compound gives this B. F. Goodrich belt good resistance to food acids, most greases, fats and alkalies. It can handle cold products down to zero, as well as hot ones up to 212°. Food particles can't grind into Highseal's smooth, polished surface. That's why it's so easy to clean. Oily foods, sticky icings, even scuff marks from banging pans, wipe right off with a damp cloth.

Probably the first thing you'll notice about the Highseal belt is its attractive green color. Lighting experts call it "eye-rest" green, and the contrasting color makes it a great improvement over dark belts for the inspection of baked goods and most fruit and vegetables.

Find out more about this longer-lasting, work-saving belt for food handling. Let your B. F. Goodrich distributor show you a sample and give you further information. *The B. F. Goodrich Company, Dept. M-593, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

FOOD ENGINEERING
MARCH, 1956 VOL 28 : NO. 3

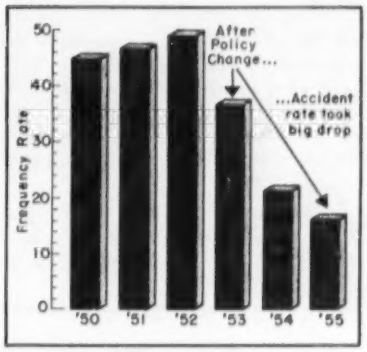


Protective devices alone not enough . . .

. . . It took responsibility . . .

Accidents Cut in Half —By the Men Having Them

Elpco fixes responsibilities through supervisors . . . And program saves many thousands of dollars in insurance



. . . To turn trick

GEORGE E. STANLEY
Director, Industrial & Public Relations, Exchange Lemon Products Co., Corona, Calif.

Exchange Lemon Products Co. has more than halved its accident-frequency rate—toppling it from a critical high of 48.7 in 1952 down to 21.3 in 1954. And the final 1955 figure has lowered it under 17.0.

This excellent anti-accident performance has already brought the Corona, Calif., company insurance-premium refunds of $55,000 for 1954-55.

▶ How did the company do it? Answer: By direct application of the old principle that safety programs work best when the key plant operations men have their specific responsibilities all clearly fixed and well understood.

Reversal of the rate dates from the September 1953 meeting of the company's General Safety Committee. This was a revolutionary occasion that followed keen analysis of the ominous plant-mishap situation.

Here, the committee chairman (Elpco's Industrial Relations Director) spotlighted the problem of safety. And when discussion by the 30-odd supervisors failed to develop a concrete approach, he moved immediately into his own new plan:

▶ 1. Successful accident prevention—in the company's considered opinion—could come only from the men who were having the accidents.

2. Under the present system, these men could be reached most effectively through their supervisors.

3. In the future, each supervisor would be held personally responsible for the results in his department.

4. Performance as a supervisor would in great part be judged by his accomplishment in reducing accidents.

It was then emphasized that the Industrial Relations Department would neither specify prevention methods nor direct programs in any company department.

I.R.D. would, however, retain an assistant skilled in accident prevention. And this specialist would be available for advice and assistance.

The Department would also provide materials and information as needed,

Big supervisor safety committee ineffective . . .

and it would serve as a reporting and record-keeping office. Through this office every supervisor would be regularly advised of the accident and safety results in his department as compared with all other departments.

Shock Treatment

The chairman also expressed his confidence in the ability of the men to get good results. He told them that he couldn't conceive of any reason for the past poor records except their lack of sufficient time to work on the problem.

▶ Then he triggered his shock treatment:

"I am now giving you time to work on the problem. This committee has commonly taken several hours of your time each month. I am now abolishing the committee. There will be no further meetings. Please use your time to lick your problem. The meeting is adjourned."

The supervisors were quiet and grave as they filed out of the room—and then, almost at once, better results became evident on their lines.

. . . But small staff committee gets results

To back them up, safety activities were placed high on the agenda of the weekly managament conferences held next day by the Production Superintendent and the Plant Engineer, with their supervisors.

Then from departmental organizations, subsequently formed, there came a full range of ideas—from special bulletin boards, on which every man received a gold star for each accident-free day, to the assignment of an assistant foreman to the task of interviewing every man in the department and writing a new accident-prevention section in all job descriptions.

The exact method mattered very little. What really counted was that practically every worker had become strongly aware of, and observably interested in preventing accidents.

Responsibility Key to Results

As a further follow-up, a new safety committee was appointed. It included the chairman of the Workman's Safety Committee, the Industrial Relations Assistant in charge of safety, the Plant Engineer, Production Superintendent, and Industrial Relations Director.

At first, this committee met on call at frequent intervals, then regularly each month. This new committee was notable in that it could function with less formality and greater dispatch than the former, larger committee.

Initial meetings were devoted to the establishment of a simple, but competitive, reporting system, also to con-

(Turn to page 157)

From Wrong to Right on Safety

PROBLEM: Even though Elpco was continuing to grow—to where it employed up to 900 workers in a most modern, efficient plant—its vigilant safety program wasn't keeping pace.

Worse than that, 1952 saw the accident-frequency rate rise to 48.7—nearly double the national average for the plant's classification.

In fact, for two consecutive years, insurance-claim cost had exceeded premiums paid.

ANALYSIS: Put under study, management absolved safety engineering. For the records showed that accident severity had always remained low.

Rather it was the workers: How could they be made fully conscious that they were the only people who could prevent accidents?

The company had a General Safety Committee that included some 30 key supervisors. It met faithfully, made recommendations, gave instructions, and served as a safety forum. Yet these moves weren't "clicking".

Meanwhile, a Workman's Safety Committee was active as an independent non-executive group. Reporting regularly to the General group, its ideas had usually proved sound and had been acted on speedily.

ACTION: So ineffectiveness of the General group was targeted in the new drive by Elpco's Industrial Relations Director.

He found that the right people were already making the efforts and their attitudes were favorable. All they really needed was a keener responsibility.

This article reveals the drastic method by which this executive sharpened that responsibility—and the big dividends that resulted.

Inorganic Chelating Additives Up Quality of Many Foods

- **Improve texture in procesed fruits and vegetables.**
- **Stabilize dairy and confectionery products.**
- **Aid color and moisture retention in cured meats.**
- **Lengthen shelf-life of canned fish.**

C. G. SCHNEIDER
Calgon, Inc., Pittsburgh

As process and quality-control tools, chelating agents are unique in their ability to form soluble complexes with troublesome metallic ions—thus effectively inactivating them.

Of the inorganic chelating compounds (also called sequestering agents), the only commercially important ones are the sodium phosphates —variously known as complex, condensed, molecularly dehydrated, or polyphosphates. Included in this group are such crystalline compounds as the pyrophosphates, tripolyphosphates, and a series of glassy materials with P_2O_5 contents ranging from 60 to 70%.

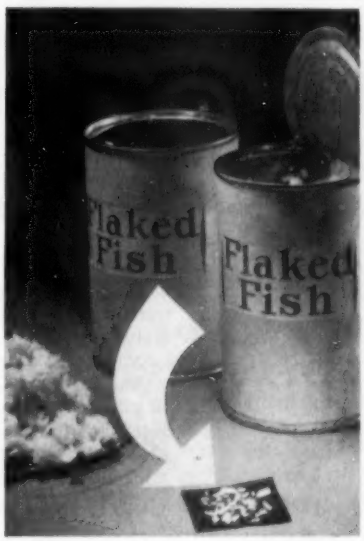
► **Commercial extraction of pectin** from calcium-bearing foods (apple pomace and citrus pulp) was an early application of polyphosphates, since their action is directed mainly to calcium and magnesium.

In this case, phosphate reacts with some of the insoluble calcium pectinate of the fruit to form soluble sodium pectinate. To what extent sequestration is involved is not definitely known. But use of about 2% of sodium metaphosphate (based on weight of pomace or pulp) increases the pectin yield to 20% or better.

Other fruits similarly affected include strawberries, blackberries, raspberries, cherries, grapes, currants, cranberries, and plums. Obvious advantage of cooking with polyphosphate is that the processor may produce a satisfactory jam or preserve without addition of extra pectin.

► **Softening of pectinous vegetables,** such as pumpkin and squash, is accelerated when they are cooked with sodium metaphosphate. And the resulting pulp has a smoother consistency.

In the canning of tomatoes, it is known that addition of a calcium salt has beneficial firming action. With products such as catsup or tomato paste, however, a softening action is desired. This can be accomplished by use of a polyphosphate.



GLASS-LIKE struvite crystals (arrow) in canned fish formerly caused liability suits. Now, sodium metaphosphate prevents their formation during product storage. This exemplifies what can be done with chelating agents to improve food products.

Resulting product, because of its greater soluble-pectin content, develops higher viscosity and a better color. If cooked to some desired viscosity, it will have a solids content lower than that of the same item made without phosphate.

Skins of peas and beans also contain pectinous substances, with toughness being directly related to the amount of pectin present as insoluble calcium pectinate. If hard water is used to blanch these vegetables for canning or freezing, calcium in the water may combine with pectin in the skin to increase the toughness considerably.

However, if the water is first softened by a proper amount of polyphosphate, product tenderness is maintained. Moreover, if additional phosphate is used above that required to soften the water, the excess reacts with calcium pectinate in the skin to yield a product of increased tenderness. This technique has been used commercially by processors such as Green Giant.

Another application closely related to blanching is use of polyphosphate for soaking of dry beans in the manufacture of pork and beans. In this process, beans usually are soaked overnight during which they almost double in weight. Sodium metaphosphate in the soak water accelerates initial uptake of water, although final uptake is not affected. But beans soaked in phosphate solution are more tender and have more uniform texture. This process also is used commercially.

► **Proteinaceous foods** react with polyphosphates, sodium metaphosphate in particular, over a wide pH range. In acid solution, this agent precipitates some proteins without denaturation. The patented principle offers a number of interesting possibilities in protein-recovery processes and as a method of treating industrial wastes.

At higher pH values, the reaction may involve sequestration of calcium and magnesium, which almost invariably are constituents of proteinaceous foods. For example, sodium metaphosphate greatly improves the whipping property of gelatin—important in the manufacture of marshmallow and ice cream.

Process cheese contains calcium ions which cause the melted product to break down unless an emulsifier or cheese-melting salt is present. Phosphate and phosphate mixtures are

(*Turn to page* 200)

OTOE FOOD'S heat-and-serve casserole meals and individual meat pies are packed in attractive lithographed tins, their

Builds Business by Specializing

Nebraska canner gears plant to produce heat-and-eat foods.

GEORGE KOLB, JR. and JOHN V. ZIEMBA

Respectively, Chief Chemist, Otoe Food Products Co., Nebraska City, Neb., and Associate Editor, "Food Engineering"

It was a matter of inevitability with Otoe Food Products Co., Nebraska City, Neb. Just like trying to sweep back the ocean with a broom!

The tide represented an increasing demand for services on foods purchased, and for a diversified line of specialty products. These were brought about by higher wages and consumer acceptance of convenient, "ready-to-heat-and-eat" items.

The tide was slow in coming about, but this firm was ready for it—and with much more than a broom.

Its post-war business consisted of a fine line of eight specialty canned meat items (like beef and gravy), packed under the Morton House brand.

Also produced were four competitive soups, meat-sandwich fillings, and high-quality dry items such as hominy, spaghetti, pork and beans, lima beans, baked beans, etc.

This versatility enabled the firm to operate on a year-'round basis, employing about 250 men and 150 women. But price competition and raw material-price fluctuations made it imperative for the company to become still more versatile and add new specialty products, designed to gain consumers' acceptance.

"Heat-and-Eats"

In short order, the research and development department came up with two new types of special foods—casserole products, and individual pies.

First of these specialties are one-dish dinners put up in hermetically sealed, drawn, casserole-shaped tins. Lid need only be cut off and the tin "popped" for a 12 to 15-min. oven-brown bake. Dishes are not required, as the flat-style, lithographed tins serve as casseroles.

These tasty, quick-serving dinners include potatoes au gratin and ham, meat and spaghetti with bacon garnish, sliced beef with vegetables and gravy, and tuna en casserole.

Also packed in casseroles are macaroni and cheese au gratin, chicken with vegetables and rice, and tuna and noodles.

And out of the experimental kitchen will soon come scrambled eggs and diced ham, garnished with several slices of cheese, and a turkey dinner, including sliced turkey, candied sweet potatoes, and old-fashioned dressing. Also, researches have been underway to develop a complete line of fruit and custard-type pies, to be packed in ready-to-serve tins.

Preparing Casserole Items

In making au gratin, slabs of lean ham are run through a Dipple dicer that cuts them into ¾-in. cubes. In 215-lb. lots, these are collected in portable, stainless steel tubs, which are loaded in 250-gal. steam-jacketed, stainless kettles for a 20-min. braising at 200 F.

Similarly, peeled potatoes are machine-diced in ⅜-in. cubes, and charged into stainless, perforated baskets for a 4-min. blanch at 212 F. in 100-gal. capacity kettles.

Potatoes are then added to the braised, diced ham in the jacketed kettles. Also added are fresh milk, stabilizer, and seasonings. This is followed by cooking for 3-4 min. at 200 F.

Next, the batch is transferred to the 30-gal. capacity, stainless supply hopper of a piston-type, straight-line, volumetric filler. Machine has two filling heads, each depositing 15¼ oz. of product per stroke in a casserole.

Prior to filling, these containers are conveyed through a company-built, 3-ft. can washer. Here, in an inverted position, they are high-pressure sprayed with 200 F. water. Emerging practically dry, the tins are fed (right-side up) to a conveyor passing under the filler.

GRAPHIC OVERALL VIEW of skillfully engineered production lines for manufacture of "ready-to-heat-and-eat" canned food products will be found in this month's special FE Picture-Flowsheet. Just turn to pages 104-107.

other Morton House products in paper-labeled ones.

in Specialties

High profit items supplement dry ones

A curved strap-iron guide transfers filled casseroles to a mesh conveyor going to a check-weighing station. Further along this line, slices of cheese (¾ oz.) are placed on the food. A sheet of parchment paper is then added to prevent cheese from sticking to container lids during retorting.

Starwheels feed casseroles to rotary, four-head seamer. Then they continue to a four-head vacuum sealing machine and finally through an enclosed, hot-water spray tunnel. Sealed tins are loaded into retort crates, with wire-mesh screens sandwiched between each layer to insure rapid, uniform penetration of heat and, thereby, prevent overcooking of product.

Sliced beef and vegetables with gravy is prepared in practically the same manner. Only difference is that the four ingredients—gravy, sliced beef, shoestring potatoes, and shoestring carrots—are individually prepared and filled in the casseroles.

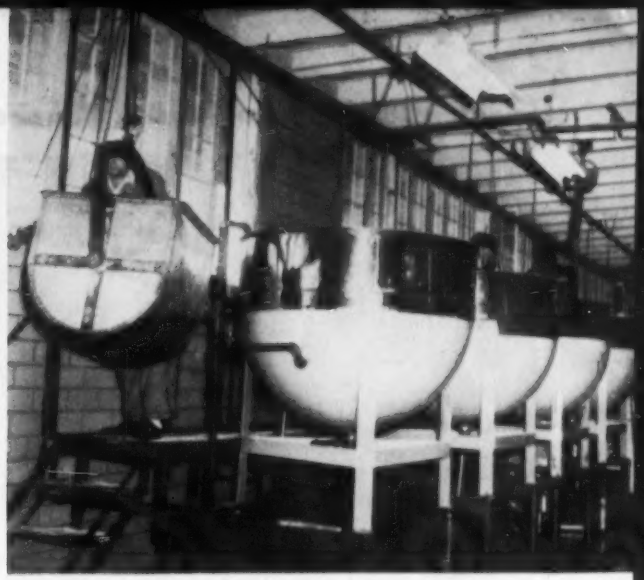
Gravy—a mixture of beef stock, seasoning, stabilizer, and water—is cooked in jacketed kettles in 150-gal. batches. Same piston-type filler deposits 4¾-oz. portions in spray-washed tins, two at a time. Blanched carrots and potatoes (3¼ oz. each) are packed along opposite sides of the container. Sandwiched, in shingle-fashion, between the vegetables are beef slices (4¾ oz.), cut by a modified bacon-slicing machine.

For the meat and spaghetti product, spaghetti, meat, and sauce are separately prepared and blended.

Cut in 6-in. lengths, spaghetti is loaded in perforated, stainless crates and blanched for 25 min. in a 150-gal. kettle containing boiling water, then drained.

Beef trimmings are fed to a meat grinder with a ½-in. plate. From here, the meat drops to an enclosed inclined worm-screw conveyor that feeds a continuous, company-designed meat braiser. This 20-ft. steam-jacketed unit is equipped with a worm-screw feed having a perforated steam pipe above it. Capacity of unit is 200 lb. every 7 min.

Sauce—a mixture of tomato paste, water, seasoning, and stabilizer—is made up in a steam-jacketed kettle. Then it is gently blended with meat and spaghetti in a horizontal



FOR casserole type items, meats and vegetables are charged in these 250-gal. kettles by vat hoist (left). Cooked products are discharged from bottoms of kettles.

FILLED casseroles are check-weighed by girls in background and, when necessary, garnished with cheese or bacon (foreground). Cheese for garnish is cut on slicer (right).

MEAT PIES have top dough trimmed and crimped on unit (rear) then move to vacuum sealer (right).

Spaghetti and Meat Balls, Canned Baked Goods

FOR meat balls and spaghetti, latter is weighed in cans (foreground), then 4 meat balls are added. Finally, cans are filled with tomato sauce in 10-pocket unit (rear).

IN making canned baked goods, glace fruits and other dry ingredients are weighed, then blended with liquid shortening in kettle (right).

mixer. Batch is transferred to hopper of filler, which feeds 15¼ oz. to each casserole. Contents is garnished with two strips of bacon (¾ oz.), then tins are vacuum-sealed and heat-processed.

Making Pot Pies

Chicken and tuna pies are prepared in the casserole department. Each of the hermetically sealed tins contains a tasty filling covered with a tender, flaky crust. All the housewife does is remove the lid and slip the tin in a 500 deg. oven for a 15 to 20-min. bake. Then out comes a piping hot, brown crusted pie.

Filling is cooked in 225-gal. stainless, steam-jacketed kettles. Valve at bottom is then opened discharging to a portable truck, from which the filling is scooped into the supply hopper of the filling machine.

Speed of filler and master pie line (Colborne) are synchronized. And pump motor on filler is equipped with variable-speed drive for easy adjustment of amount going into tins.

Special pastry dough is purchased in 100-lb. lots and kept under refrigeration until ready for use. It is fed to a divider, and formed into the proper size and weight for top crusts. Pieces are then belt-conveyed to a high-speed crust roller, and sheets (for 1-oz. crust) are transferred to the 80-per-min. pie line.

Meanwhile, Otoe-made lithographed pie tins are fed from a trough-type chute to a chain-driven conveyor that proceeds through a shop-constructed, enclosed, hot water-spray washer (5-ft. long). From here they drop on a tray, and are hand-placed in metal jigs (pie-plate holders), four to a section.

Tins proceed to the filler that meters 6½ oz. of filling into each of two tins at a time. Filling (chicken, for example) consists of chicken-meat pieces and broth, peas, carrots, rice, red peppers, stabilizer and necessary seasoning.

Next an operator places rolled dough sheet over the tins, which continue through a crust trimming and crimping station. Then they are check-weighed. A 4-head vacuum sealer applies lids (13 in. vacuum), (Turn to page 175)

See How They've Grown!

It all started in Otoe Food's none-too-spectacular 1936-40 expansion period, when efforts were made to produce items called specialties—products with special appeal that command large margins and have national merchandising potential.

But first significant progress was not until 1941, when the company produced can-packed, ready-to-eat-without-cooking date roll in a specially designed automatic oven. This oven became the center of a departmentalized operation, which has since produced millions of cans of Morton House brand date roll and oven-baked pork and beans. Soon, such other items as fruit and pound cakes, plum and date puddings were can-packed and baked in this department.

Worked for Uncle Sam

During World War II, the company virtually turned over its resources and equipment to the US Quartermaster Corps, packing about 50 important overseas rations.

Its development and research section showed extreme activity during this period, producing about 20 items that were submitted to the QMC. About half of these were incorporated in the Army Canned Food Specifications.

A continuous laboratory testing and evaluating program was carried out on all types of raw materials that could be canned alone, or in combinations. Over 3,000 experimental packs were put up so future problems in development of specialty foods for civilians could be quickly evaluated.

Post War Changes

No wonder Otoe Foods was immediately recognized as a specialty packer at the end of hostilities. And many large processors began utilizing this firm's facilities for manufacturing products on a contract basis.

Meanwhile, a complete change was taking place throughout the plant. Canning of field products, which for years had been of prime importance to the company, was gradually discontinued. Corn processing stopped in 1951, leaving only limited packs of peas and asparagus put up under the Otoe brand.

The growing and expanding company then bought can-making equipment from Crown Can Co. Can plant now produces 50,000,000 containers annually. Otoe is one of the few canneries to boast a complete operation from raw tin plate and raw food to finished can and processed edibles.

Total number of cans packed jumped from about 30 millions in 1945 to over 55 millions in 1955. Dollar volume climbed from 2½ to 6 millions in the same period. And plans are now underway for introduction of Morton House products to all of the 48 states.

Quaker Oats Automates Pneumatic Handling System

Installs controls to regulate air velocity, adjust product feed, clean fouled lines, and maintain constant discharge. System eliminates infestation, is economical to install and operate

FRANK G. JUN and EUGENE J. GEHRIG
Milling Engineers, The Quaker Oats Co., Chicago

Refinements in pneumatic conveying systems have greatly expanded their applications, particularly to the moving of ingredients and byproducts from one point in a plant to another.

They eliminate insect breeding spots, operate more economically, and require far less building space than conventional handling units.

This has been forcefully demonstrated in the case of The Quaker Oats Co., which installed a fully pneumatic corn mill at Chattanooga, Tenn., in 1952.

The mill represents approximately 12 yr. of experimental and development work (mainly in Europe) and is the only one of its kind in North America.

Milling organizations have been conveying whole grain, feed ingredients or mill byproducts pneumatically for more than 30 yr. using high-pressure, positive-displacement systems.

These blow lines are usually fed through rotary volumetric airtight feeders, and the product is precipitated centrifugally from the air stream. The positive displacement blower will rarely function at pressure loads exceeding 11 psi. which is approximately its maximum rating. Air velocities within the 10-12 in. dia. lines will vary from 4,500-5,500 fpm., depending on type of material being conveyed.

Negative-Pressure Systems

More recently, pneumatic systems have been developed and marketed for bulk unloading of feed ingredients by use of negative pressure. These are available as complete units containing nozzles designed for maximum efficiency, properly sized lines with telescoping sections, efficient receivers and air separators, and either positive displacement or centrifugal type blowers.

They convey at rates ranging from 20-30 tons/hour. depending on caliber

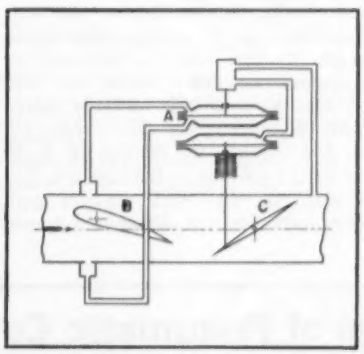


FIG. 1—AIR REGULATOR valve is installed between separator and header. It consists of diaphragm (A) which is actuated by vane (B) that measures pressure difference dependent on momentary air velocity. Deviations in differential cause butterfly valve (C) to open or close as needed.

of the men handling the nozzles. Equipment can be designed far in excess of capabilities of any combination of two or four men handling the nozzles.

Power requirements range from 2 hp./ton up, depending on nature of ingredients and distance it is conveyed. Normal losses for such a system range from 3-8 psi. and, on occasions, run as high as 11 psi.

Primary difficulty in reaching maximum efficiency is the fact that the air stream is never loaded at a constant rate or to its maximum carrying capacity. Consequently, losses vary from maximum to minimum many times during any given period of operation.

Multiple Strand System

The new type pneumatic mill is composed of a series of tubes, each carrying its own stock from one machine to the machine next in calculated flow. Tubes vary in size from 2½-5 in. dia., depending on weight and volume of stock that is to be conveyed.

Each tube has its own centrifugal or aspirator receiver which discharges the stock through a lock to insure proper air flow. As many as 25-30 centrifugal receivers vent to a single header which operates at partial vacuum, varying from −2 to −5 in. Hg.

Air mover is a single-stage, high-speed, high-static, centrifugal fan which vents 4,000-5,500 cu. ft./min. to a suction-type dust collector. To counteract loss due to the cloth in the filter, additional low pressure fan equipment is provided, which vents either to the atmosphere or to the room in which it is located.

Quaker Oats Chattanooga mill contains over 70 pneumatic lifts comprising three systems comparable to the one described above. Measurements indicate that whole grain is conveyed at speeds only slightly in excess of 4,400 ft./min.

A 4½-in. dia. pneumatic line handles 230 lb./min. and conveys 7.1 lb. of material per lb. of air. Total drop across the line, including three 90-deg. elbows, one aspirator receiver, 40 ft. of vertical and 10 ft. of horizontal duct, was measured at a −53

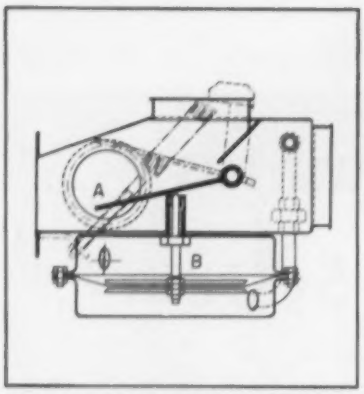


FIG. 2—PNEUMATIC FEEDER consists of spring-loaded flap (A) attached to diaphragm (B). Small copper tube transmits changes in partial vacuum from conveying pipe to diaphragm chamber causing flap to move and adjust feed.

in. of water (approximately 2 lb./sq. in.).

Mill stock leaving the first reduction or first break rolls is conveyed in a 4¼-in. dia. tube at the rate of 100 lb./min. and an air-material load of 7.5 lb. Loss across approximately the same duckwork as for whole grain measured −26½ in. water, somewhat less than 1 psi.

Several Problems Posed

In a conveying system of this type, volume of air pulled in each lift must remain relatively constant on an hour to hour basis. Furthermore weight of product conveyed in each lift must remain constant and must be fed at an unvarying rate. A deviation of 10% in either requirement will result in failure of the entire system.

Another problem is the one of re-starting a pneumatic system after it has bogged down with fouled lines due to power failure.

One way to counteract this is to oversize the system. This would allow a certain amount of contingency in the mill designer's calculations and would result in minimum number of shutdowns due to choked lines. Unfortunately, however, this would increase the mill's operating cost substantially, and, also, its initial cost and that of necessarily larger building.

4 Units Solve Them

In view of this, a number of controls have been designed which serve to make pneumatic conveying very practical and all but foolproof.

1. Air Quantity Regulator

Air flow in a single pneumatic lift is controlled by means of a diaphragm-actuated valve, normally installed between receiver and header to which receiver vents (see Fig. 1). This is the clean air side of the system.

Diaphragm is actuated by the pressure differential created as the air stream passes across a streamlined air foil. Latter is positioned so that any deviation in a pre-set differential across its face (due to increased or decreased air flow) causes the diaphragm to actuate a butterfly valve. This valve opens and allows more air to flow through the system, or closes to restrict air flow as the case may be. Diaphragm will "hunt" its own position until pressure differential across foil has returned to its original set level.

Setting of air foil depends entirely on nature of product conveyed and is done while system is at full load. Product is introduced and a Pitot tube with manometer is used to deter-

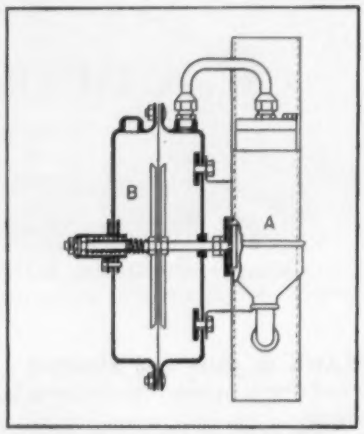


FIG. 3—ANTI-CHOKE valve comprises cover (A) attached to diaphragm (B). Latter is actuated by difference in pressure at two points in conveying line.

mine speed of conveying mixture. Foil is positioned to satisfy requirements of stream being conveyed at its most efficient speed based on past experience and empirical data.

Where as many as 25 lifts are venting to a single header, the control elements will serve another function. Removal of one lift from the battery will cause an immediate reaction on the remaining 24. The fan will tend

Principles of Pneumatic Conveying

Falling in air, particles encounter the restraining force of the air. Magnitude of this force increases as velocity of particles increases until it equals effect of the force of gravity.

When this state is reached, the particle will cease to accelerate downward and will thereafter settle at a constant velocity. This speed is commonly referred to as the particle's *terminal* velocity. The restraining force at this point, expressed in pounds or fractions thereof, is equal to the weight of the falling particle.

Vertical Conveying

If this procedure is reversed and the particle is introduced to a vertically rising stream of air, the same principles apply. The particle at first will precipitate with accelerated speed relative to the speed of the air stream. But, as the air speed is increased, a point will be reached where the speed of the particle relative to it becomes constant. At this point, the particle is said to have *again reached its terminal velocity*.

If the air speed is further increased, a condition will be reached where relative velocity of the particle with respect to speed of air is exactly equal to the absolute velocity of the air. Speed of the air at this point is commonly referred to as the *flotation* velocity of the particle. Here, the particle ceases to move downward and, for all practical purposes, remains suspended in mid air. If the speed of air is further increased, the particle will commence to rise and accelerate vertically.

Horizontal Conveying

When being conveyed horizontally, a particle will soon settle to the duct's bottom wall. Length of time required for this precipitation will depend entirely on the particle's weight and the diameter of the duct.

To prevent this, mean velocity of air must be increased to provide a restraining force at the duct's outer wall. This must be greater than the resistance force acting against the particle as it effectively slides along the duct's bottom.

It has been determined empirically that a mean velocity 60-70% greater than the particle's flotation velocity will provide the necessary restraining force at this area. It follows, therefore, that of the two types of pneumatic conveying, horizontal is more critical.

An intimate correlation exists between the critical conveying velocity, the restraining force developed, and the quantity of air required to lift or convey horizontally. Magnitude of restraining force varies directly as speed of conveying air stream and, also, as the quantity of air being moved.

Given a constant velocity and a constant diameter duct,

to pull the same quantity of air as formerly and, since pressure requirements will vary only slightly, the whole system's conveying velocity will increase. This would tend to increase abrasion and product damage as well as consume more power per ton conveyed. When all pneumatic lifts are equipped with previously described control units, each will maintain its original air flow.

2. Pneumatic Feeder

To insure a constant feed to the system, a diaphragm-actuated device was provided (Fig. 2). It automatically feeds a lift in such a manner that chokes are a remote possibility. Diaphragm is directly connected to a slide which regulates grain flow. Slide is spring-held at its normally open position.

Control unit functions on the principle that pressure developed at a point just behind the first 90-deg. elbow in the lift varies almost directly as the load passing through the elbow. Diaphragm is, therefore, connected through copper tubing to this point. And pressure developed as the line is loaded tends to counteract spring tension on the regulating slide. This reduces quantity of feed, and, after a pre-set maximum load is reached, feed rate will remain constant. Control valve is adjusted by varying tension of its slide spring. Once the setting is made, feeder will never exceed, under normal operating conditions, its maximum rate.

The air flow and feed rate controls compliment each other under full load conditions, and guarantee that the system is carrying a constant load, operating at maximum capacity, and functioning at its most efficient level.

3. Anti-Choke Valve

A third control has been devised which automatically cleans a fouled line in the event of a power failure (Fig. 3). Diaphragm on this control is connected directly to a cover plate which opens to admit air or closes to make the system airtight. Diaphragm is actuated by pressure differential created between points ahead and behind the fouled area which, under choke conditions, is at maximum.

Action of the device is to admit air to the line ahead of the choke zone, which tends to remove product in that area. This causes feeder control to close, allowing the line to further clear itself. As differential across the diaphragm decreases, due to removal of the constriction, air bleeder valve closes and feeder begins to load the pneumatic system again.

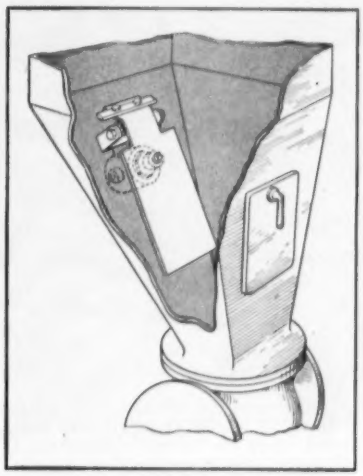


FIG. 4—LEVEL INDICATOR in separator is connected with air regulator valve. When product rises above predetermined level butterfly valve of air regulator closes and conveying stops. When product level falls conveyor operation resumes.

4. Level Indicator

A fourth control is mounted in the aspirator receiver (Fig. 4). In event of a fouled condition at its air lock, or any point succeeding it, control automatically short-circuits air flow valve, stopping flow of air to the lift. When choke is removed and aspirator clears itself, control returns to its normally closed position, which engages the air flow valve. Anti-choking device clears the line and automatic feeder commences once more to load the air stream to its maximum carrying capacity.

The multiple strand conveying system and its control units, we feel, definitely fall into the realm of something new and unique in the materials handling field.

The system eliminates infestation which is of vital interest to the producer and should be of utmost concern of all of us as ultimate consumers.

The controls incorporate infinite flexibility and are automated within the normal requirements of the milling field. They demonstrate the progressive strides taken in current years in this direction.

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however, it is possible to overfeed a pneumatic line and exceed the air's ability to develop restraining force necessary to keep the particle in suspension, Obviously, the quantity of air has a direct relationship on the conveying capacity of a given pneumatic lift.

Single pneumatic systems can be found operating at mixtures of 2 lb. of material per pound of air. And suction systems are being designed to convey at ratios up to 4, 5, and 6 lb./lb. air, depending on the nature of the product. Generally speaking, the less dense the material, the less the quantity of air required to convey it. Conversely, the denser the material, the lower the air-load ratio will be.

Power Loss at Elbows

Unfortunately, the laws which apply to air flow apply only in part to pneumatic conveying. Normally, the power loss in 90 deg. elbows in conventional dust collecting systems can be expressed in terms of straight line power loss, since effective dust load is ignored.

Very little correlation exists, however, between pressures measured at *no load* and those measured in *heavily-loaded air streams*. Field measurements indicate that the power loss in a single 90 deg. elbow doubles, trebles, or even quadruples as compared to the loss at no load. This is dependent entirely on the nature of the material being conveyed and the extent to which the air is being loaded.

Losses at each elbow will vary approximately as the kinetic energy required to change the direction of the product's flow and the energy necessary to re-accelerate it to actual conveying speed.

Additional Losses

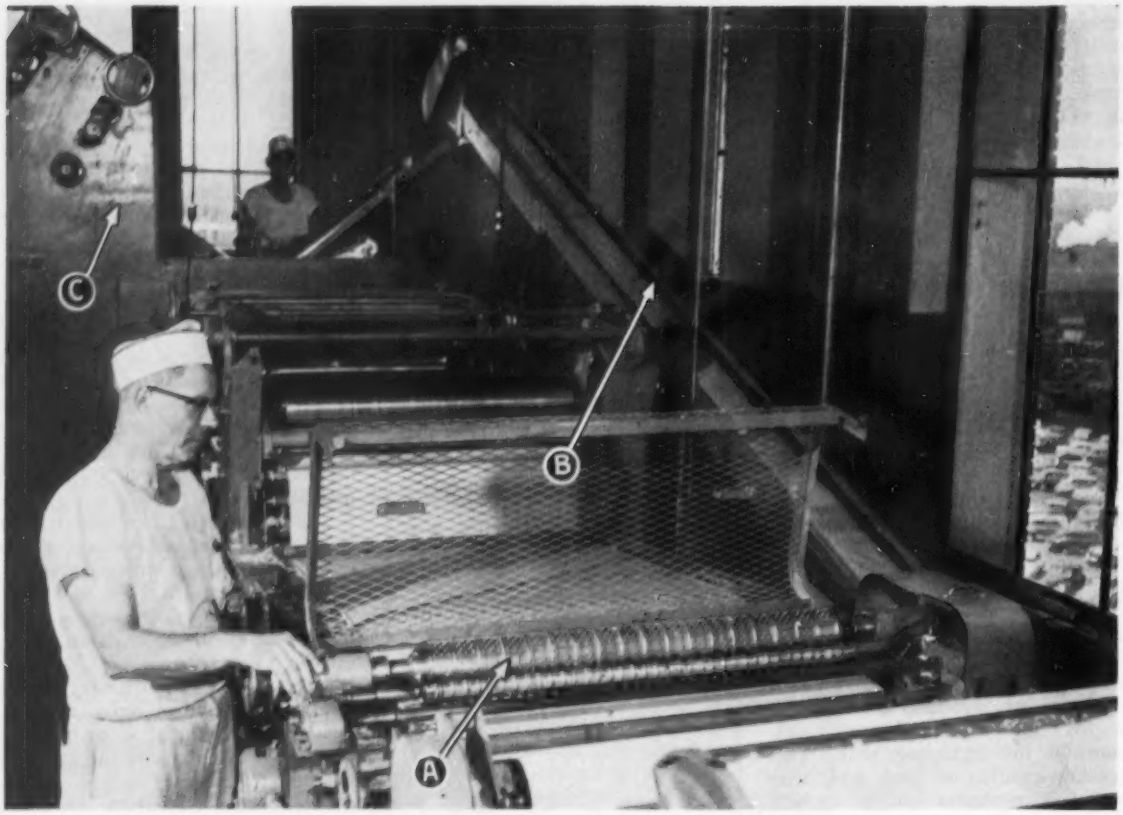
One of the greatest losses of a pneumatic system occurs at the point where material is introduced to the air stream. This *full load loss* is a reflection of the power required to accelerate the product to conveying speed. Under normal conditions, this loss can be expressed in terms of the product's gain in momentum.

Loss in vertical sections of the duct varies directly with energy required to lift the product from one level to another. It reflects the product's gain in potential energy.

Horizontal losses vary almost directly with energy required to overcome mechanical friction as product rides bottom of pneumatic tube. And total system loss is the sum of energy losses plus computable air losses.

Although the energy losses are more or less of a non-computable nature, they are usually expressed in terms of multiples of straight line or load loss.

These factors, as we normally refer to them, are the result of experimentation on existing blowlines. They will vary from 2.5-10 times the equivalent straight line no load losses, depending on material being conveyed, conveying speed, and air-material load.



ROTARY CUTTER (A) was specially developed for this cracker line to handle 3,000 lb. hourly. Trimmings are belt-conveyed (B) to latest cross-sheeter (C). Speed of cutter automatically varies with apron.

Advanced Engineering of Unit Operations Highlights—

LATEST IN COOKIE LINES

Sharp boost in efficiency won by Johnston in non-stop cracker and cookie production . . . Notable equipment: Dump hopper, cross-roll sheeters, rotary cutters, and shingle stackers . . . Packaging also streamlined

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

Back in 1952, Robert A. Johnston Co., of Milwaukee, ran full clip into shoal waters of insufficient production.

There was a continuing skyrocketing demand for its superior quality crackers, cookies, chocolates, and candy—without the necessary facilities to satisfy it.

What finally brought the company back into high water was a carefully planned modernization program. This initially involved a keen review of advanced operations in other plants throughout the country. Subsequently, all production routines were thoroughly scrutinized at Johnston's own plant, with every weak point then brought up to required strength to assure top processing performance. ▶ **This revitalizing was especially significant in the firm's cracker and cookie lines.**

Put into action during this project were some of the latest types of machines, also additional equipment specially designed for better output, and spanking-new processing techniques. And, since the installations were made on one cookie line at a time, production hummed on without interruption.

Much planning, too, has been directed to the simplification of tasks with specific attention to promoting employee comfort and safety.

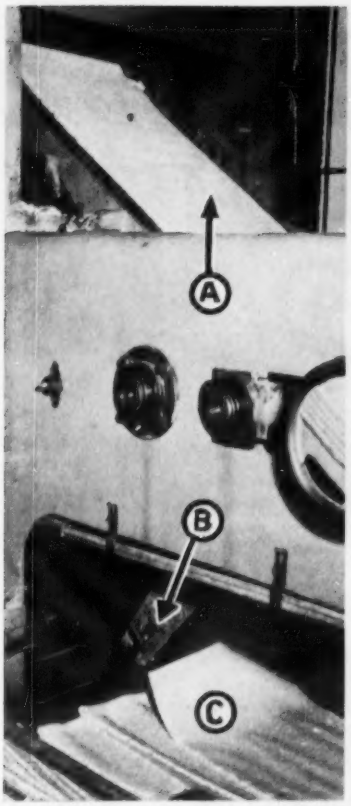
Of outstanding interest, however, are the stepped up operations, marked by straight routing of products through the many processing stages.

Improvement Run-Down

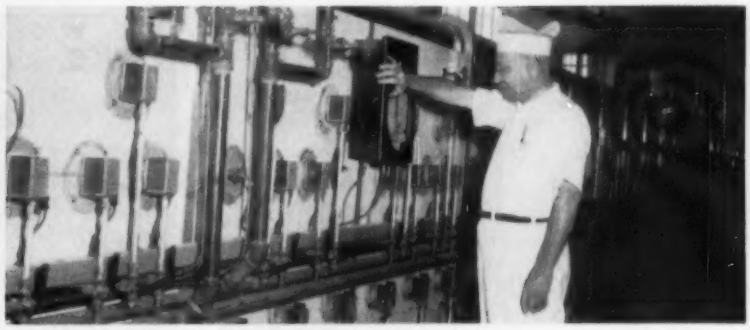
These six process modernizations implemented the program:

1. **Hydraulically-operated hoppers**

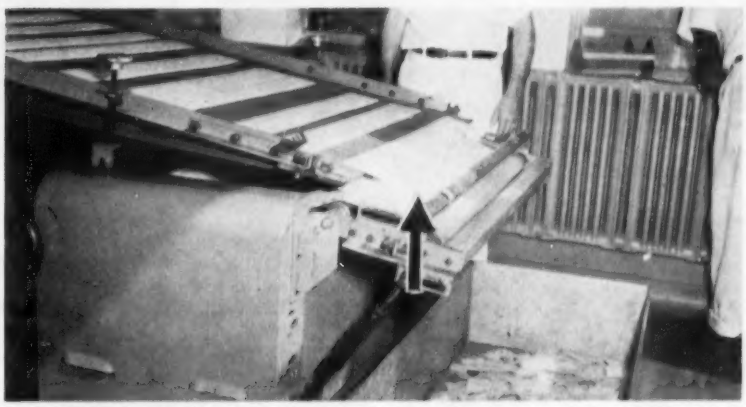
Sheeting, Scoring, Baking, Stacking



PORTABLE cross-sheeter forms dough into sheet (A). Oscillating aprons (B) then cross-sheet it (C).



AFTER scoring, dough sheet travels through this 4-zone, continuous band oven, with automatical temperature controls and foolproof safety devices.



EMERGING from 200-ft. oven, baked crackers pass under rotary breaker (not seen here) and move on to canvas-covered plate (indicated by arrow) that shingle-stacks them. Top uniformity is maintained.

for direct feeding of cookie and cracker doughs to sheeters.

2. New cross-roll sheeter on soda and graham cracker line for quality flake-forming of crackers.

3. Specially-designed rotary cutters on crackers and sweet goods lines for uninterrupted output.

4. Efficently operated continuous band ovens and well-engineered safety and performance features.

5. Simplified method of shingle-stacking and feeding of ¼-lb. cracker units to wrapping machines.

6. Impressive method of feeding ¼-lb. packages of crackers to cartoning machine.

Now, to observe how efficiency was engineered into the production of quality crackers on Johnston's four modernized lines—one of which is for crackers, another for bar goods, and the remaining two for sweet goods:

Soda and honey graham crackers are produced in batch-type rotary mixers, and sweet goods in three tub mixers.

Scale hoppers (5-bbl. capacity) are pre-set for desired weights, with flour stream automatically cut off when pre-set weight has been charged into them. Hoppers are then monorailed and their loads are lever-discharged into mixers. Empty hoppers return to loading position by pressing push-buttons. Here, hoppers are automatically filled to preset weight for reloading into mixers.

Further changes now underway are modernizing the flour-handling system.

Refrigerated water is metered and other ingredients are manually scaled into mixers. Time of mixing and number of rpm.'s that agitators turn are automatically controlled.

New Dump Hoppers

Two hydraulically operated hoppers for feeding doughs to cookie and cracker lines are company-designed. Doughs for sweet goods and graham and soda crackers are transferred from troughs to these 5-bbl.-capacity hoppers, which feed them directly to sheeters on the floor below.

The troughs ride over a pair of 4-ft. rails until front ends lock onto the hoppers. Then, by operating a 3-way valve, each hydraulically motivated hopper raises and dumps dough to sheeters.

A closeup, now, of actual production of crackers—grahams and sodas—on Johnston's mechanized line:

Dough drops from dump hopper between a pair of feed rolls with gripping bars that form it into a continuous sheet. This sheet then goes into a portable cross-roll sheeter (Peters), where it continues through two pairs of adjustable-speed sizing rolls. It then drops between chain-driven, oscillating-type aprons that cross-roll the dough (build it up in layers), thereby giving the baked crackers their flakiness.

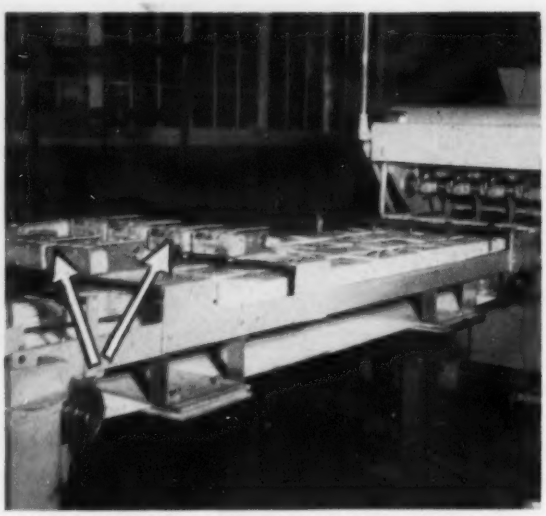
Sheet next travels along a chain-driven canvas apron and through a pair of sizing rolls. Reduced to final thickness, the sheet is then conveyed by still another chain-driven canvas apron to the specially fabricated rotary cutter (Greer).

Portable cross-sheeter assures flexibility, since it can be rolled off the line and replaced with sizing rolls for production of sweet goods.

Output of the newly designed ro-

Packaging Line Is Well-Engineered

STACKED crackers (A) are speedily picked up for feeding onto pin conveyor (B) that carries the product to wrapping machines.



LIMIT SWITCHES (arrows) maintain pre-set bank of ¼-lb. cello-wrapped packages in four rows going to cartoner.

PACKAGES (four ¼-lb. units) are auto-inserted in set up cartons, which are then glued and sealed.

tary cutter is 3,000 lb./hr., and a similar cutter has been fabricated for the sweet goods line. Here, the dough sheet travels between a pair of gage rolls and drops onto a canvas apron. It continues under the variable-speed cutter, which is backed up by a steel roll. Constant pressure is maintained (with air cylinders) between roll and cutter.

These cutters are equipped with small pins that hole-punch the dough sheet to facilitate gas release during baking and assure production of easier-to-package flat crackers. Rotary "clearer" disks intersect cutter to prevent dough sheet from wrapping around it. These disks rotate in opposite direction to cutter. Trimmings are then returned by conveyor-belt to the cross-roll sheeter.

Scored sheet of cookie dough then proceeds through a 200-ft. Greer oven with a Sandvik steel band. Oven has four 50-ft. zones, equipped with top and bottom gas burners. Here, temperatures are automatically controlled.

Variations in tension on the endless oven band are pneumatically controlled after pre-setting air pressures to desired tensions on a regulator. The tension differences are due to the temperature changes that the oven band undergoes during baking and cooling.

Baking system's controls are completely interlocked as a safety precaution. Exhaust blower, for example, purges oven for a 5-min. period before gas valve opens and then ignites. In event of air, gas, or fan failures, the system automatically shuts off.

Each zone is equipped with a manually operated damper for humidity control. And eight distributors reignite burners during 25-sec. cycles. Air is exhausted from each zone at a 2,000-cfm.-rate. And hot air is carried out of the building through aluminum insulated ducts.

Oven has an adjustment chart for each product. Indicated are burners that must be on or off, temperature of top and bottom sections in all four zones, and baking time.

Leaving oven, cookies travel on a 20-ft. oven band extension. Below return portion of band, rotary wire brushes remove any carbonized cookie pieces. Here, too, a 14-in. blower distributes cooling air through a duct below conveyor band of on-coming cookies.

At end of band, a stationary take-off knife transfers cookies onto a pair of cooling belts. A small roll then operates cross-belt-wise to break the cookies into strips, two-cookies wide.

Strips then strike a canvas-covered wooden bumper set at a 30-deg. angle. This shingle-stacks them as they are transferred in opposite direction onto an inclined belt conveyor going to the floor below.

Further cracker cooling is attained as goods travel along a 100-ft. ceiling-suspended wire-mesh belt. Crackers are next transferred onto a canvas-belt conveyor and broken by a set of plastic coated wheels. Crackers emerge from breakers in 2x2 scored units of four crackers.

Mechanized Packaging

An important phase of mechanization is packaging—stacking and feeding ¼-lb. units of crackers to wrapping machines and then to cartoning machine.

Girls load the units onto a chain-driven pin conveyor feeding a battery of five Battle Creek wrapping machines (one serves as a standby). Chain consists of equally spaced 4-in. vertical plastic pins with a stainless steel bottom plate on which crackers rest.

Conveyor can be readily adjusted, with a ¼-in.-wide vertical board, for switching from sodacrackers to the thicker graham crackers.

Cellophane-wrapped ¼-lb. packs are discharged onto an inclined chute where vertical divider bars feed them, in four rows, onto a rubber-belt conveyor. Fifth wrapping machine is ar-

Straight-Through Operations on Cookie Lines

COOKIE DOUGH is hopper-fed into rotary molder. Then 18 rows of cookies continue on to either the 100-ft. or 150-ft. band oven.

MARSHMALLOW and nut-topped cookies are belt-conveyed to chocolate coater, later move through cooling tunnel.

ON THIS efficiently conveyorized line, cookies are packed into cartons that are formed on deck and chuted to conveyors alongside packing table.

ranged to feed cello-wrapped packs into any one of the four rows.

Puts Limit Switches to Work

Two transfer units assure automatic accumulation of four rows of packages, thereby preventing jam-ups in the Jones cartoning machine. First transfer unit comprises a pair of limit switches for each row of packages. These switches are arranged to maintain a pre-determined bank of ¼-lb. packages for each row.

This is accomplished when short rods, attached to each pair of limit switches, are raised by the packages to energize a solenoid that actuates a tripping mechanism to permit the package to enter the transfer unit.

On a transfer belt feeding the four rows of packages to the cartoning machine, two sets of chain-driven paddles push any number of rows of two packages onto a collecting belt. Here, two sets of limit switches prevent over-feeding of packages.

Should cartoner shut down, one set of switches interlocks solenoids on a tripping mechanism. Other set of switches actuates a clutch on the main drive of the cartoner so that a full bank of packages is continuously fed to the second transfer unit.

Now four ¼-lb. packages of crackers are transferred onto a belt traveling to the rotary elevator section of the cartoner. Four packages are then automatically loaded into cartons, which are set up one at a time from a magazine holding them in flat form. Carton flaps are machine-glued before the loaded cartons continue through a compression section on the way to the case-loading station.

As for the sweet goods line these, briefly, are the operations:

Dough is hopper-fed from the floor above through corrugated rolls. Sheet of dough is then fed either to a rotary cutter, bar machine, rotary molder, or wire cutter. Cookies then continue through a 100- or 150-ft. Greer oven.

Leaving latter, they travel along a cooling belt. Here, cookies may be bulk-packed into caddies, or they go to the temperature-controlled packing department on the floor below.

One line moves to the Oakes depositor, where marshmallow and jelly are deposited. From here, they are conveyed through the enrober and brine-refrigerated cooling tunnel and onto the packing table. Cookies are either bagged or packed into trays that are cellophane-overwrapped.

Cookies on still another line pass through a Peters depositor, Greer enrober, and cooling tunnel. They are then hand-packed into bags.

On still another line, cookies are bulk-packed or packed into trays that are overwrapped.

Notable in the fulfillment of this extensive cracker-and-cookie modernization program were the leading parts taken in the cooperative efforts by E. J. Fretz, president; E. E. Kienappel, vice-president; R. M. Jameson, general superintendent; F. Trubshaw, chief engineer, and his associates, Armon Walters and Warren Lancaster; Harvey Wild, industrial engineer; and Dan Wing, chief chemist.

THIRTY-ONE samples of a wide variety of specialty foods now being packaged in collapsible metal tubes in Europe.

Packaging in roll-up metal containers analyzed as

Europe Accepts Food in Tubes

Consultant explains what's behind this trend overseas and discusses technical and cost factors involved

DAVID N. LEWIN
Lewin Associates, Food Consultants, New York

There is general acceptance in Europe of a large variety of foods packaged in collapsible metal tubes. And a few products are retailed only in the tubes.

But why has the squeeze-tube made so much progress abroad?

And what factors are involved in this type of packaging?

Pointers on these questions will help interested American food manufacturers to evaluate collapsible tubes and to avoid pitfalls.

First, let us consider special reasons for this type of packaging in Europe:

The quite limited distribution of home refrigeration restricts the market for fresh and frozen foods, and for some canned items as well.

Then the shoppers over there purchase food for the day, or even for the next meal. Without adequate refrigeration, leftovers are a problem. Therefore, foods are bought in smaller quantities.

So the advantage of the tube—with its small quantity and its protection against oxidation through tight reclosure and little or no headspace—are readily apparent. Yet, these features also are important in this country. And there is a growing interest in this type of packaging here.

So let's take a look at the technical and cost factors:

To be successfully packaged in a collapsible metal tube, any food must be specially prepared, following laboratory investigation. Chemical and physical properties must be examined—as well as texture, moisture content, grinding properties, etc. Many foods are marketed in the old country in such paste-like form. In fact, European feeling is that any food properly prepared can be packaged in tubes and meet European consumer acceptance.

Of course, any food prepared for metal-tube packaging must be of a consistency to pass readily through the narrow orifice or outlet of the tube. Also, the consistency, viscosity, and homogeneity of the product must be such as to insure a continuous flow and a complete absence of lumps large enough to clog the opening.

Furthermore, the product must be so processed that there is no separation in storage, no settling, no hardening of the product in the tube, nor any precipitation from emulsified products.

At the same time, preparation of a product for tube packaging, must not affect the taste of the product.

To Protect Quality

Lining tube interiors with a protective coating is difficult and relatively costly. Often before some foods can be tube packaged it is necessary to develop special protective materials for tube liners.

If properly coated, metal tubes can be used for almost any food. But the problem of obtaining the proper lining is rather complicated. The right coating frequently must be developed to meet the requirements of a specific food product. To be satisfactory, the lining must not affect the product, yet must supply adequate protection of the food throughout an extended shelf life.

Coating Problems

In Europe there is wide experience in the manufacture of coatings and linings by manufacturers of metal containers for foods.

However, this valuable knowledge can be utilized by manufacturers of tubes only to a very limited extent. Applying a lining to a tube is far more difficult than coating sheet metal that is to be formed into cans.

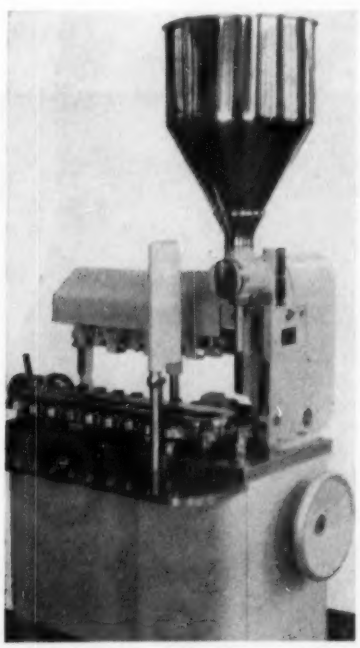
Tubes are extruded from a small piece of metal. As a result, the coating must be applied on the inside of the formed tube in such a manner that the coating evenly covers the entire inside of the tube—including walls, shoulders, neck, and orifice. This operation obviously is more complicated than coating a flat sheet of metal.

A coating to be applied to the inside of a tube must possess greater adhesive qualities and bond more thoroughly to the metal than coatings for can-making metal sheets. Since the tube is collapsible, there must be adequate assurance that the coating cannot be separated from the metal during use. Likewise the coatings for tubes must be unbreakable. If cracks occur and the food makes contact with the metal of the container, spoilage is only one of the possible results.

Coating materials used in Europe are generally of a plastic basis. A Swiss patented epoxy coating (Araldite) is used in almost every European country now.

Basically, the same coating material is being processed in this country now. Reports on experiments show that the coating can be considered satisfactory for collapsible tubes for many foods.

Further efforts should enable the manufacturer to perfect the material and to make it proper for any food-in-tube package. This assumption is based upon reported experiments on viscosity, adhesion properties, flexibility, and chemical resistance—plus application and curing data. Then, too, the manufacturers have the European experience at their disposal.



MACHINE fills food into metal tubes volumetrically. Tubes as large as 1¾-in. dia. can be handled by this unit.

Mechanical Filling

Adequate tube-filling machines are available—of both foreign and domestic manufacture. Some of these machines already meet sanitary requirements and are adjustable for different tube sizes, with rapid changeover. Capacity of the largest imported machines is approximately 50 tubes per min.

The volumetric fill by means of plunger is easily adjustable and independent of product viscosity. Tube sizes which the machines will fill vary from the smallest to a tube of 1¾-in. dia., holding 8 oz. For the foods requiring them, hoppers and pipes can be provided with stirring devices and heating facilities.

In addition to filling the tube, these machines tighten the cap and close the other end of the tube by folding, crimping, and corrugating to make a triple-fold closure.

In-Tube Sterilization

In some respects, the sterilization of tubed foods—such as meat products—is less complicated than sterilizing canned foods. Both tubes and linings will withstand temperatures up to 250 deg F. And there are no signs of lessened flexibility or increased shrinkability as a result of sterilization heat. Furthermore, organoleptic tests do not disclose unfavorable changes of odor and flavor.

Although sterilization of foods in tubes has proved satisfactory in Europe, nevertheless the conventional retorts are not suitable for this type of sterilizing. Special equipment, designed to meet particular requirements of type, size, and shape of the tubes, is required.

There must be a constant equilibrium of internal and external pressures during all heating cycles—the coming-up, "thermal death time," and cooling periods. So the apparatus must be equipped with precise instruments for efficient heat and pressure control.

Due to the small size and cylindrical shape of the tubes, sterilization time

(Turn to page 157)

These Foods Are in Tubes . . .

On the list of tube-packaged European foods are meat products, including liver spreads, pâté de foie gras, pickled ham, smoked ham, and French roast.

Among fish products so packaged are anchovy, spreads of smoked and pickled salmon (lox), herrings, smelts, sprats, kippers, buecklings, eels, and many kinds of caviar and crustaceans. A few are imported into the U. S.

Meat and fish combined with mayonnaise, mustard, horseradish, gravies, and sauces have been successfully marketed in Europe.

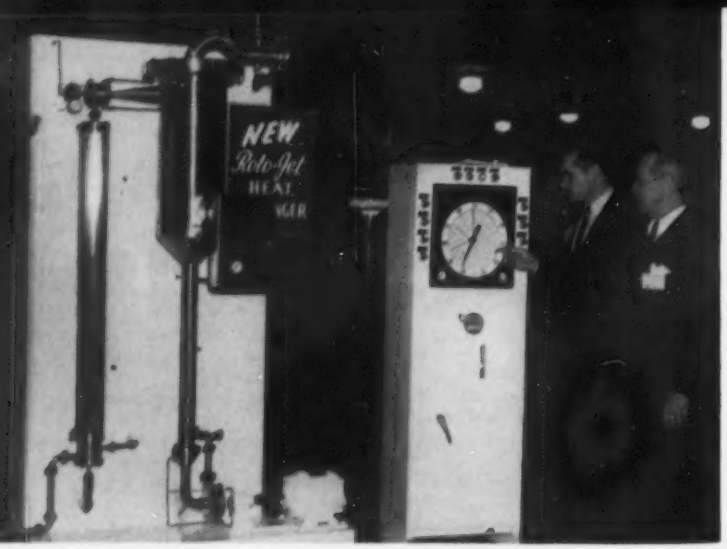
Tube-packaged dairy products include spreads of soft and semi-soft cheeses, tubes filled with evaporated milk, sweet cream, sour cream, cream cheese, etc.

Syrups and sweetenings, including chocolate syrups and a variety of icings, represent the confectionery field. Similar products include fruit and berry sauces and jellies.

Switzerland and France supply mayonnaise, mustard dressings, sauces, and gravies to the European market.

Italy offers tomato products, pastes, and sauces.

Even seasonings and condiments, prepared in paste consistency, find an acceptable market in collapsible metal tubes. Also liquid coffee.



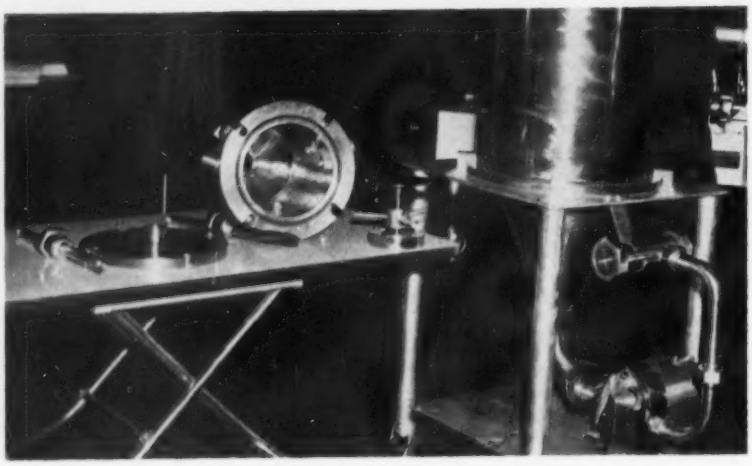
Processors View

CM&SA's Atlantic City Show

processing, and

2 Heat Exchangers

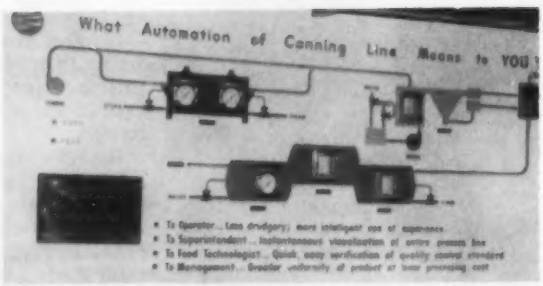
RAPID STERILIZING of liquids and semi-liquids — with no burn-on — is made possible with this new heat exchanger. Product pumps through direct steam-injection head and up holding tube, equipped with reciprocating, pitched baffles. Flash chamber removes steam-added moisture. Pump removes sterile product.—W. F. & John Barnes Co., Rockford. (62A)



CONTINUOUS processing of solids and semi-solids is accomplished by dropping food on spinning plate which throws product against tube walls. Steam from nozzles turns plate and heats product. Special valve (lower right) is set for desired holding period.—W. J. Fitzpatrick Co., Chicago. (62B)

4 Control Units

FULLY AUTOMATIC retort control regulates venting, cooking, and cooling cycles for tin and glass-packed products. Different cooks actuated by push-button.—Weston Electrical Instrument Corp., Newark, N. J. (62C)

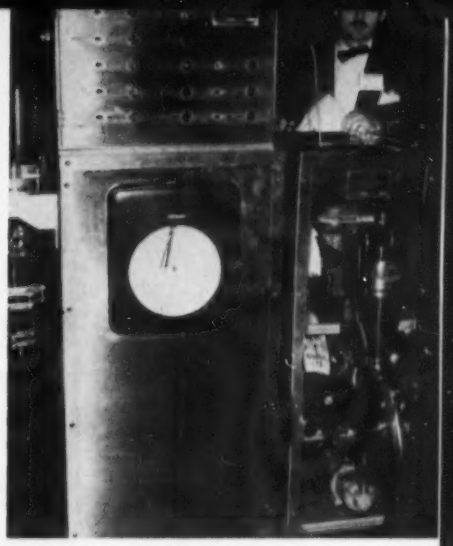


COMPLETE PROCESS CONTROL employs quickly interchangeable, modular indicators and controller-recorders. —Taylor Instrument Cos., Rochester, N. Y. (62D)

ELECTRIC REGULATOR replaces old-style float valves for accurate filler-bowl leveling. Probe is easy to clean. —Taylor Instrument Cos., Rochester, N. Y. (62E)

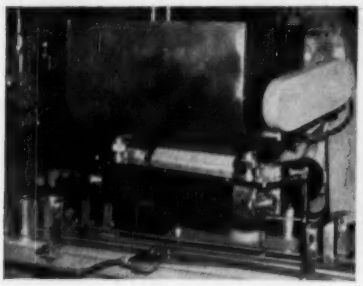
Latest Equipment

reveals 36 new instrument, packaging, labeling, filling, materials handling aids for the food packer



COMPACT liquid-dry blender combines Viscometron density control, Foxboro controller-recorder, and Fitzpatrick mixer.—W. L. Cummings & Co., Newton Center, Mass. (63A)

Filler, 2 Inspection Tables



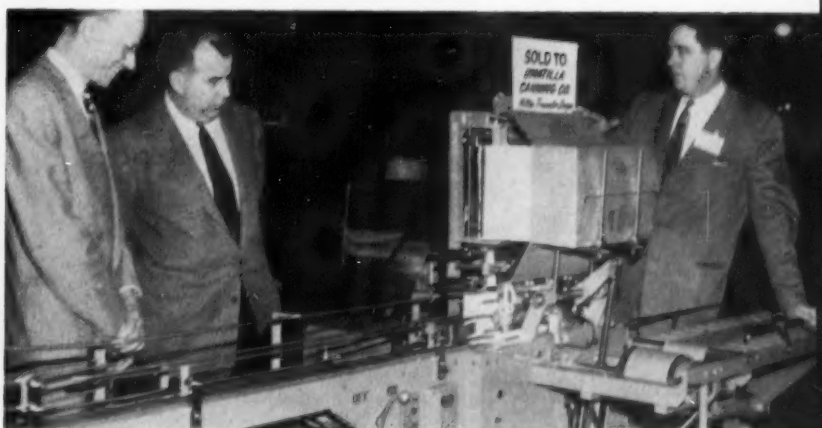
LATEST, 2-piston filler rotates to handle one or two lines. It fills 6-oz. to gallon containers at speeds to 60 per minute. Accuracy within ¼ oz.—Pfaudler Co., Rochester. (62B)

PLASTIC inspection table, lighted from beneath, now has vibrators that extend its application to solid and semi-solid foods.—H. E. Kelley & Co., Inc., New Church, Va. (62C)

VIBRATING inspection and sorting table features aluminum top coated with Tygon vinyl plastic. Unit comes in 8- and 12-ft. lengths, features quiet operation.—Food Machinery & Chem. Corp., Hoopeston, Ill. (62D)

5 Packaging Machines

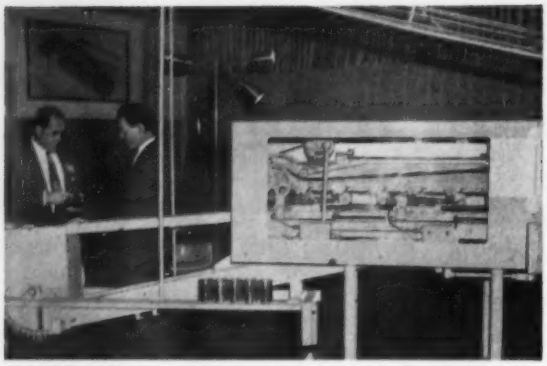
MIDGET 'Cluster-Pak' machine permits multi-packaging for small market-test runs. Packs single or double rows, 2 to 12 cans in a carton. —Atlanta Paper Co., Atlanta. (62E)



PNEUMATIC PISTONS operate this package caser at speeds up to 240 packages per min. Machine handles most rigid or semi-rigid product cartons. Automatic operation cuts labor.—Food Machinery & Chem. Corp., Hoopeston, Ill. (62F)

Turn Page for More Units

CAN-HANDLING SYSTEM employs unloader (background), elevators, and accumulator (right) for fast handling of "pattern packaged" cans at 900 per min.—Barker Co., Tampa, Fla. (64A)

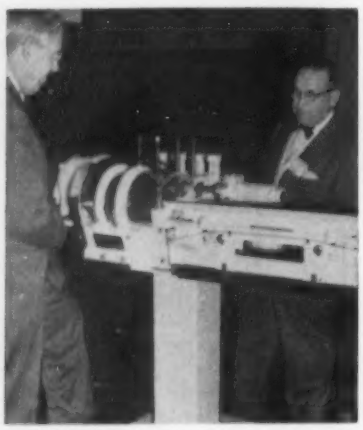


ELECTRONIC can sorter separates up to six different products as they leave cooker. Unit detects special can marks applied after sealing, and shunts products automatically to different lines.—Dudley Machinery Corp., Santa Clara, Calif. (64B)

FLEXIBLE PACKAGER cases single or multi-pack cans, from 6 oz. to No. 303 sizes, in 12-, 24-, and 48-size cases. Speeds to 1,080 cans per min.—Old Dominion Box Co., Inc., Charlotte, N. C. (64C)

Cleaner, 2 Cutters, Counter, and Chopper

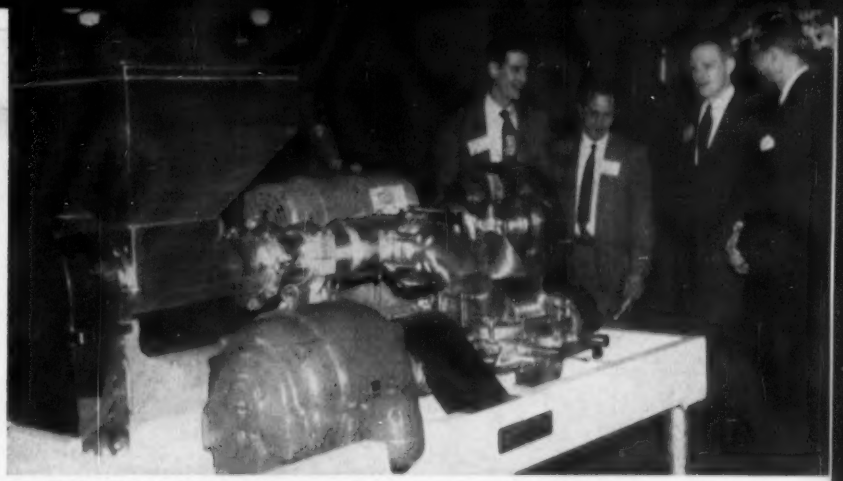
FOAM CLEANER effectively separates chaff and splits from corn, peas, and lima beans. Unique air-water mixer creates the foam.—Geo. J. Olney, Inc., Westernville, N. Y. (64D)



REVAMPED Corn cutter automatically adjusts for ear size. Control permits setting springless knives while machine operates.—Food Machinery & Chem. Corp., Hoopeston, Ill. (64E)

NEW French-fry slicer die-cuts regular or waffled potatoes and other vegetables. Thumbscrew enables dies to be changed quickly.—Sinclair-Scott Co., Philadelphia. (64F)

ROBOT COUNTER saves labor, cuts overfills. It checks premium ingredients as they enter cans.—Magnuson Engineers, San Jose, Calif. (65A)



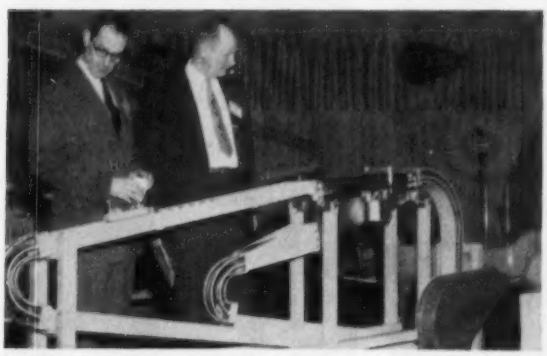
COMMINUTION under steam pressure or vacuum speeds enzyme inactivation and retards oxidative product-changes in this new combination machine. It has a variable screw feed; operates to 150 psig. pressure and 360 F. temperature. —W. J. Fitzpatrick Co., Chicago. (65B)

2 New Spot Labelers

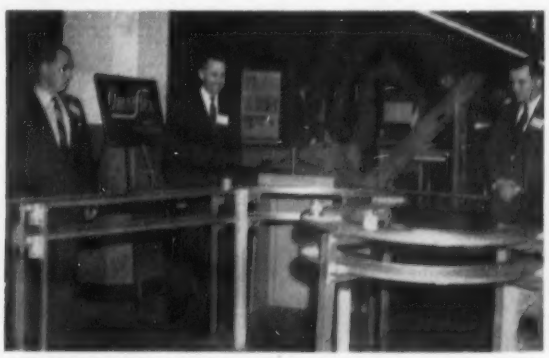
"PUFF-AND-BLOW" labeler puts spot body-labels on round, out-of-round, and multi-sided containers at speeds to 150 per min. Handles 4-oz. to gallon sizes.—Canning Machinery Co., Portland, Ore. (65C)

ANOTHER SUCTION-TYPE labeler takes wide container variety at speeds to 165 per min. Grooved, vertical rubber roll stripes glue on the labels.—New Jersey Machine Corp., Hoboken, N. J. (65D)

4 Materials Handling Aids

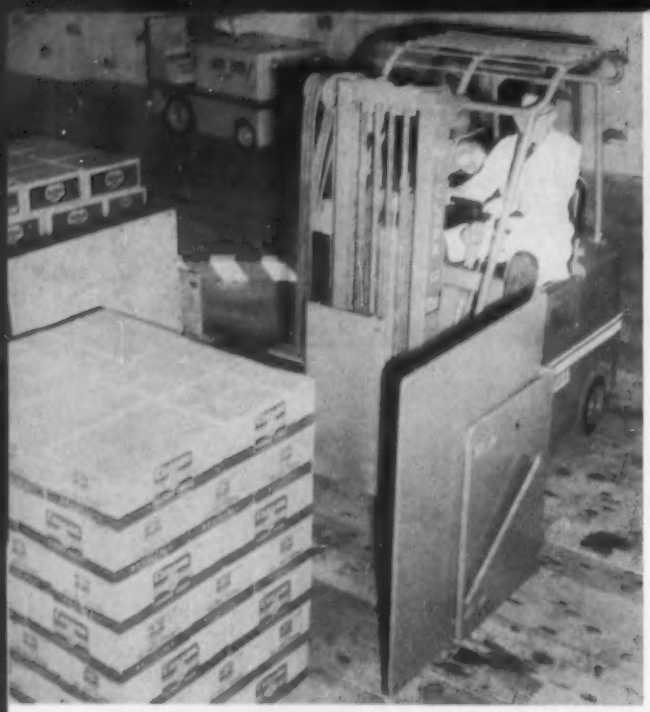


FULL-LINE bypass shunts cans to secondary line when primary route is loaded. Detection device operates electrically. Bypass incorporates fast-acting, rotory fingers that let cans drop without denting.—Dudley Machinery Corp., Santa Clara, Calif. (65E)



"SNAKE-LIKE" flexible conveyor operates around right- or left-hand curves. Minimum turning radius: 2½ times belt width.—Ashworth Bros., Inc., Winchester, Va. (65F)

Turn Page for More Units →



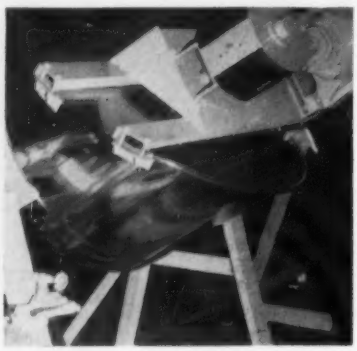
ALUMINUM ingredient bin mounts on wheels for easy portability. Product tubs give sanitary transport to peas and beans.—Aluminum Cooking Utensil Co., Inc., New Kensington, Pa. (66A)

NEW lift truck attachment grips unit loads of unpalletized cases between neoprene-covered cast aluminum arms. Arm pressure adjusts to avoid damaging 'soft' goods. Unit shifts up, down, and sideways for positioning load.—Clark Equipment Co., Battle Creek, Mich. (66B)

2 Kettles, Heater

CONE-BOTTOM processing kettle has extra bottom scrapers that insure complete product removal through a centrally located drain.—Cherry-Burrell Corp., Chicago. (66C)

QUICKLY placed in any size kettle, this steam immersion heater starts vigorous thermal agitation that cuts cook times 45%.—Hamilton Copper & Brass Works, Cincinnati. (66D)



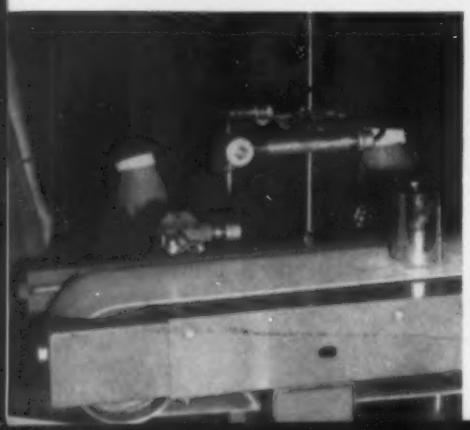
INCLINED mixing kettle mounts agitators at a 30-deg. angle to promote efficient blending of heavy mixes. It has hydraulic dump.—Lee Metal Prod. Co., Inc., Philipsburg, Pa. (66E)

2 Ingredient Dispensers, Steam Gun

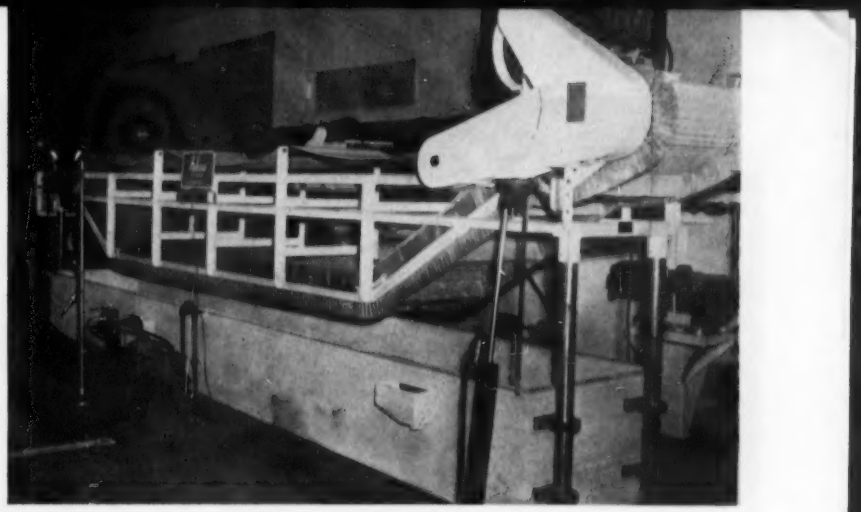
DISPENSING of small ingredient quantities is made more effective with this automatic, adjustable pump device that handles up to 250 containers per min.—C. W. Logeman Co., Brooklyn. (66F)

ELECTRONIC briner allows dialing of desired amount per can. Photocell actuator insures accurate filling, without waste, at speeds to 300 units per min.—Morton Salt Co., Chicago. (66G)

LIGHTWEIGHT steam-detergent gun ends 'hot handle' problem with insulated grip. Free-turning nozzle eases cleaning, stops hose tangling.—Oakite Products, Inc., New York City. (66H)



3 Blanchers



SANITARY hot-water blancher employs hydraulic lifters to raise conveyor assembly, and permit more effective cleaning. Compartmented, mesh product-conveyor is covered by second belt, while in tank, to positively immerse products and prevent floating of debris.—A. K. Robins & Co., Baltimore. (67A)

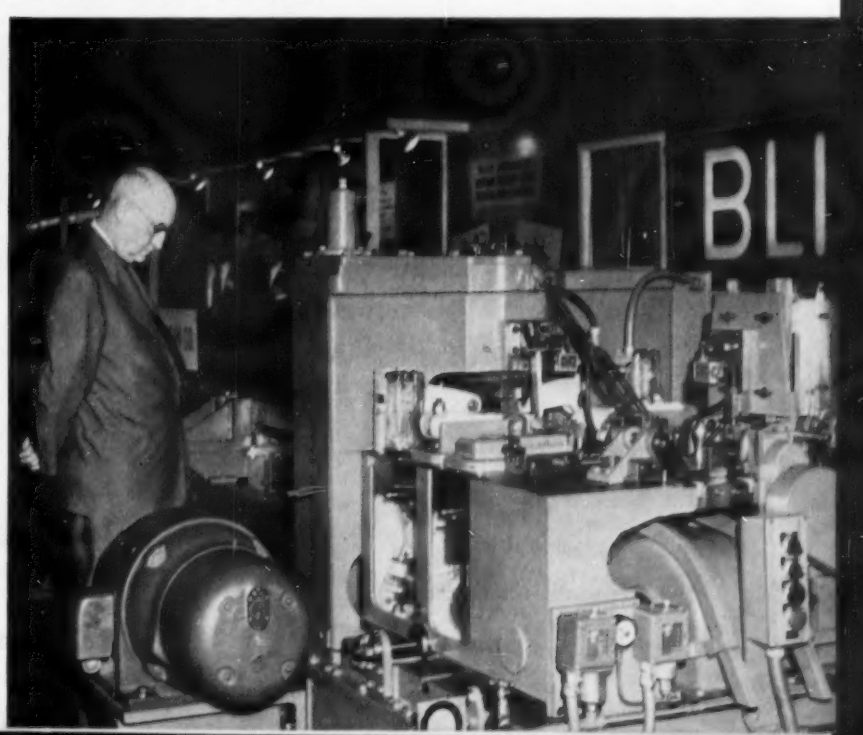
REDESIGNED rotary blancher features doors on cylinder for easy access to inside. Steam line under top of shell eliminates cold spots—Huntley Mfg. Co., Brocton, N. Y. (67B)

WIDE CLEARANCE between shell and cylinder make sanitation simple on this blancher. Only inlet and outlet ports are vented to cut cool spots.—Chisholm-Ryder Co., Niagara Falls. (67C)

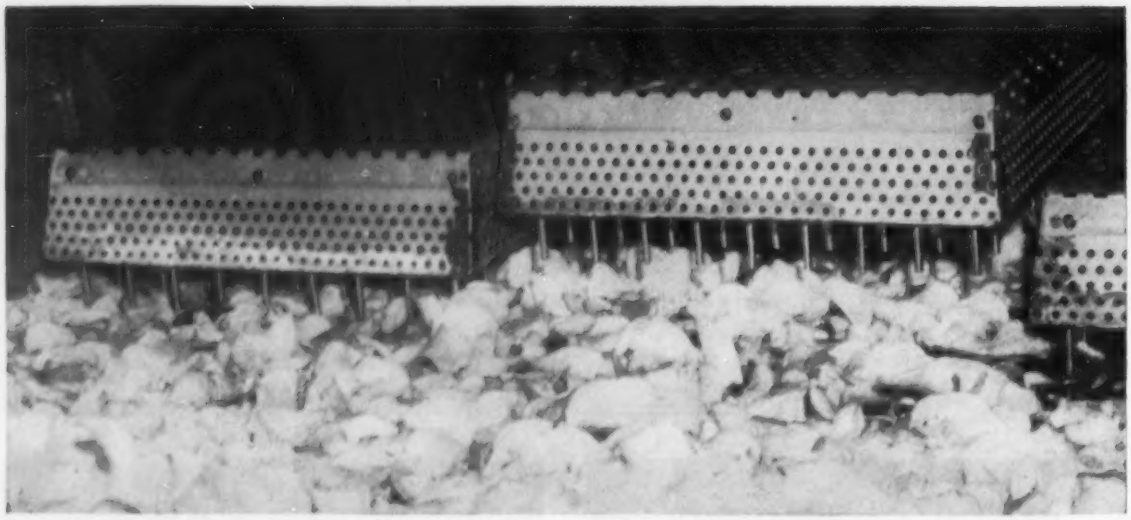
VINE FEED ups efficiency of pea and lima bean viners by positively regulating flow and eliminating bunching. —Frank Hamachek Machine Co., Kewaunee, Wis. (67D)

Feeder, Can Maker

HIGH-SPEED can body maker uses short stroke cranks and double-tooled parts to attain speeds of 450 cans per min., and increase service life of parts.—E. W. Bliss Co., Hastings, Mich. (67E)



For detailed data on units circle key numbers on Readers' Service Card in back of book



Rakes submerge and turn slices for uniform frying

More Than 2 Tons Of Chips an Hour

This "Big Fry" is top turn-out on Chicago company's new straight-through, automatic-equipment lines. Plant also has advanced bulk handling and storing, plus flexible packaging techniques

JOHN ROBERTS and JOHN V. ZIEMBA

Respectively, Production Manager, Jay's Foods, Inc., Chicago, and Associate Editor, "Food Engineering." Photos by Food Machinery & Chemical Corp., Hoopeston, Ill.

Potato chips turned out at 4,800 lb. an hour!

That's the striking performance being achieved with six continuous chip-frying lines installed at the new Chicago plant of Jay's Foods, Inc.

And space has been provided in this scientifically engineered single-story plant for future installation of two additional lines to raise hourly chip production to 6,400 lb.—well over 3 tons.

Advanced materials handling techniques and machines specially engineered for non-stop, straight-through flow are particularly credited by the company's president, Leonard Japp, for sparking the significant top-volume output.

Here is how trouble-free production of almost 2½ tons of chips hourly is attained.—

First, handling and storing: Potatoes arrive at unloading docks that handle 11 RR cars and 10 motor trailers. Further, a concrete "cross-over" between the RR tracks permits unloading of another 20 trailers.

Hydraulically operated docks enable height adjustments so that fork-lift trucks may travel into different size trailers.

Spuds are dumped from 100-lb. bags into a portable John Bean grader that sorts them into three different sizes. This later facilitates the packaging (smaller chips for sacks, larger for bulk). Graded potatoes drop into collapsible-type, wirebound pallet boxes (15-bag capacity).

Reasons these boxes were selected for in-plant handling and storing of potatoes: (1) To simplify lift-truck movements, (2) to save both labor and floor space, (3) to eliminate bruising of the spuds, and (4) to facilitate cleaning.

Pallet boxes travel over a floor-level scale, then are stacked three high in a 200x200-ft. warehouse section that holds an amount equal to 105,000 bags. A 10-week supply of spuds is received during the winter. Thus, the potatoes "cure out" better (de-sugar to enable frying the desirable crisp, light golden brown chip that picks up less cooking oil).

A portion of this warehouse is maintained at 50-60 deg. F.—a temperature range in which potatoes can be held up to two months with little sugar-to-starch conversion. Holding of potatoes in another section, maintained in the 60 to 70-F. range by blower-type heaters (14-in. dia. fans), is sufficient for de-sugaring many varieties.

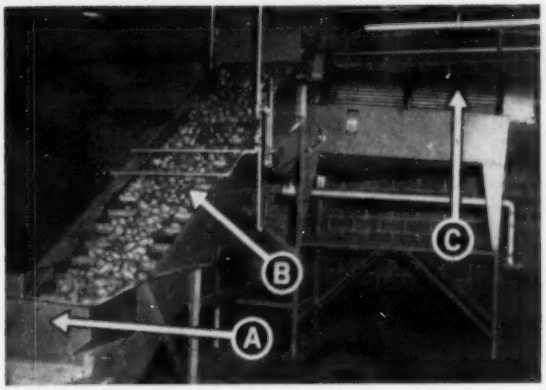
During the cold months, opening of doors alongside unloading docks automatically starts blower-type heaters. In this way cold winter air is kept out of the warehouse section.

Oil in Bulk

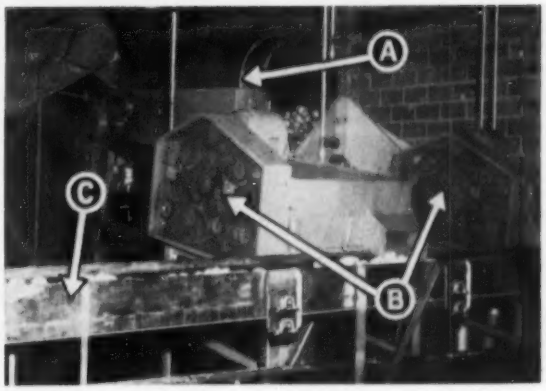
Cooking oil is received in tank cars or trucks, and it is pumped into two glass-lined storage tanks. These hold 130,000 lb.

Then, by merely pressing push-buttons, the oil is pumped, as needed, over 250 ft. to storage tanks alongside six continuous MacBeth fryers. Each stainless steel fryer-storage tank holds 5,000 lb. of oil, which is heated to

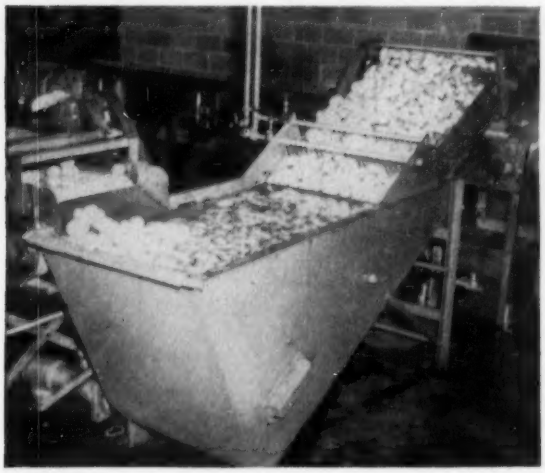
Washing . . . Peeling . . . Slicing . . . Preheating



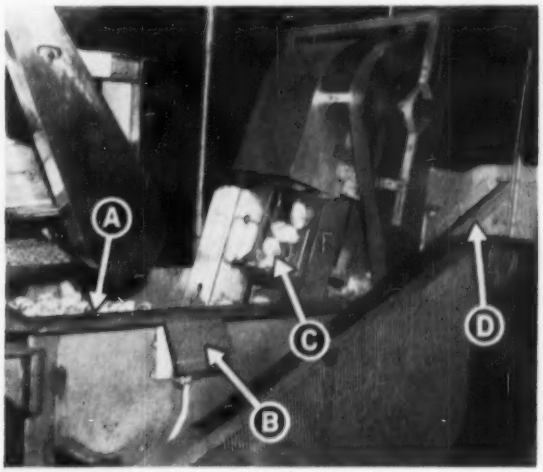
SPUDS are charged into dump tank (A). Pre-wash incline conveyor (B) feeds them to rotary washer (C).



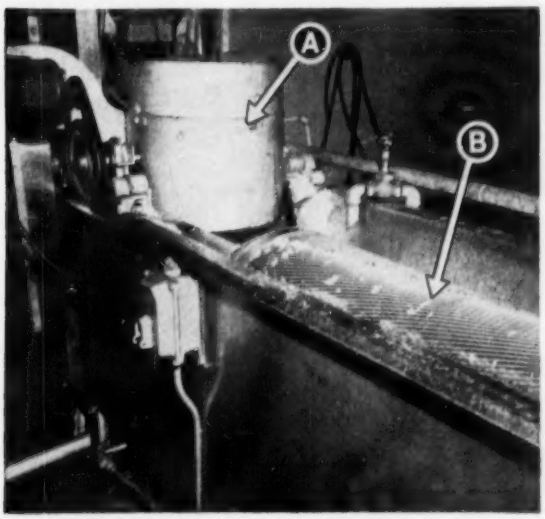
FROM rotary washer (A), potatoes go to continuous peelers (B), then onto inspection belt (C).



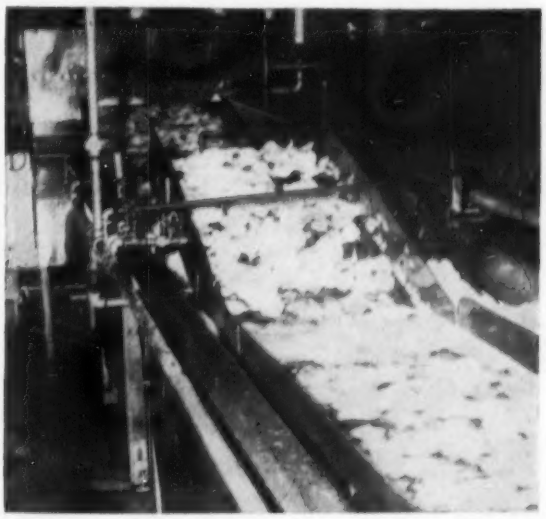
MACHINE-PEELED, inspected spuds drop in tank-type washer. Mesh belt, with sprays, gives last wash.



INTO hopper (A), with high-level detector (B), go spuds. Bucket conveyor (C) feeds them to slicer (D).



FROM high-speed rotary slicer (A), potato slices continue through rotary, wire-screen washer (B).



AFTER preheating in tank (not shown), slices go through final wash tank, then enter continuous fryer (rear).

350 deg. F. by immersed, gas-fired tubes.

Now to proceed with the non-stop mass production of the chips.

Pallet-box loads of spuds are transported by lift trucks to two Food Machinery washing and peeling lines—the smaller feeding two slicing-frying lines and the larger feeding four of them.

Washing and Peeling

On each FMC line, boxes are raised by motor-driven hoists, tilted, and discharged into a potato dump tank. This unit, built of heavy sheet steel, provides a water bath that cushions the fall of the spuds and, at the same time, initially soaks and loosens dirt.

Then an inclined pre-wash elevator, constructed of ¼x1-in. galvanized flat mesh with metal flights, lifts potatoes from the water and carries them under a series of sprays and into a rotary washer.

Capacity of the company's smaller bar-type drum washer (4 5/12x8¾ ft.) is 250 bu. per hr., while its larger unit (5 7/12x15¼ ft.) handles 500 bu. hourly.

Water is continuously sprayed at 20- and 40-gpm. over the spuds so dirt and other foreign matter are swept into an underpan draining to the discharge end of washer. Each washer is equipped with friction-clutch pulley and positive gear drive.

Peeling follows. The rotary washers discharge potatoes into feed hoppers of the compact, continuous FMC vegetable peelers (two on the smaller and three on larger capacity lines). From feed hopper in each machine, the potatoes consecutively progress, at an approximate 2-ton-per-hr. rate, through four bins equipped with peeling rollers (4 to a bin) and then move out via the discharge chute.

Peeling is achieved as the potatoes are tumbled by the rocking action of high-speed, pulley-driven, abrasive rollers. The rollers in the first three bins are coated with coarse carborundum for initial rough peeling. Fourth bin's rollers are coated with fine carborundum to do the finishing.

Preparing for Slicing

Peeled potatoes drop onto an inspection belt that carries them to an FMC bath-type washer—a water-soaking tank having an inclined, wire-belt discharge conveyor over which is arranged a series of spray pipes.

Potatoes now proceed by mesh belt into the 200x300-ft. frying and packaging room. They drop into a 3-bag capacity stainless steel hopper, equipped with a 4x12-in. metal side plate hooked to a limit switch that stops feed belt when hopper is full.

A short bucket elevator picks up two to three spuds per bucket and feeds them into a rotary cutter having a pair of two-bladed, high-speed horizontal knives. Cutter turns out about 1,500 slices (0.0050 to 0.0060 in. thick) per minute.

Slices are tumbled through a 7½-ft. rotary wire-screen (½-in. openings) washer. Here, starch is washed from slices, and the starch water is discharged into a sewer line.

Next, the slices go on an inclined, wire-mesh conveyor, where they are sprayed and drained, then carried into a thermostatically controlled, stainless steel preheating tank (3x3x8 ft.). Tank is gas-fired by two burners to convert unwanted potato sugars, and it is equipped with blower and exhaust duct.

Non-Stop Frying

Another inclined, wire-mesh belt now transfers the slices into a 3x3-ft. stainless rinse tank. Here, rotary paddles move them along.

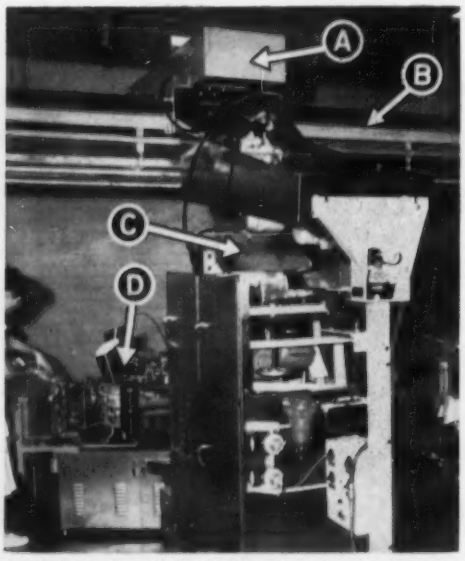
Slices are now ready for frying. Performance of each stainless, continuous MacBeth fryer is 800 lb. of potato chips per hour. Travel time through a fryer takes about 2½ min. A series of reciprocating-type metal-rake units alternately submerges and turns slices for uniform frying as they are pushed along through the 350-F. cooking oil.

An adjacent 5,000-lb.-capacity oil-storage tank contains six heating tubes that are automatically controlled to shut off gas whenever the flue motor stops. Temperature of cooking pan bottom is thermostatically controlled to check overheating of oil and carmelization of chips.

Hot cooking oil is continuously circulated from out one end of the cooker, through a filter, and then back

(*Turn to page 145*)

Frying and Packaging



ADVANCED chip fryer (above) is equipped with thermostatic controls for frying oil, safety devices for the gas burners, and oil filtering-recirculating system. Each unit fries 800 lb. of chips an hour. **RIGHT:** Packaging Line No. 1 comprises six of these machines, each weighing, bagging, and sealing about 35 bags a minute. Paddles (A) scrape chips off belt (B) and into vibrating feeders (C) supplying weigher. Filler is at (D).

Pallet Elevator Triples Speed In Case Handling

Self-loading automatic lift whips palletized goods between floors in 1½ min.... Cuts labor costs in half

PRESSING problem in food plants with second-floor warehouse areas is how to get palletized goods upstairs for storage, then down for shipping—without wasting time and labor.

Usual method is to raise and lower lift trucks and their loads in a slow freight elevator. This takes almost 5 min. per load. It results in high labor costs. And it causes transfer-point bottlenecks, because pallet loads back up while waiting to be moved.

But a speedy solution to this problem is being found in various food plants. It is the new type of conveyor-fed automatic elevating system that moves loaded pallets between floors in about 1½ min., thereby tripling handling speed.

Because such units need no operator, they save manpower, too. In one brewery, for example, old-style elevating required about 7½ min. to take a pallet load from first to second floor. With a new vertical conveying system installed by Gifford-Wood Co., Hudson, N. Y., the job is cut to 3 man-min.—a better than 50% reduction.

Facts on Automatic Lift

This system is simple. It consists of a vertical, pallet-elevating cage (or gig), a hoist, 5½-ft. chain conveyors on each floor for moving pallets in and out of cage, plus safety and control devices.

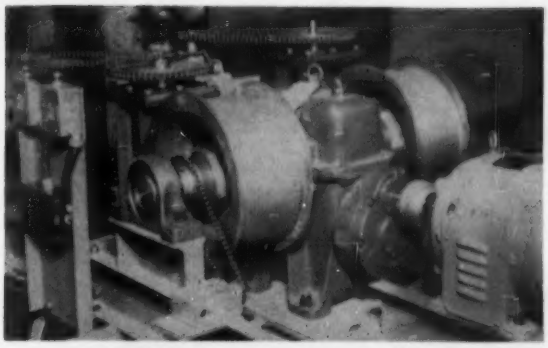
Weighing about 1,100 lb., the gig is moved between the two floors (about 14 ft.) by a cable (6 x 37 wire rope) that winds onto a 14-in.-dia. hoist drum. Counterweight for the gig is located in the conveyor shaft and weighs about 1,440 lb. (40% of total gig and load weight).

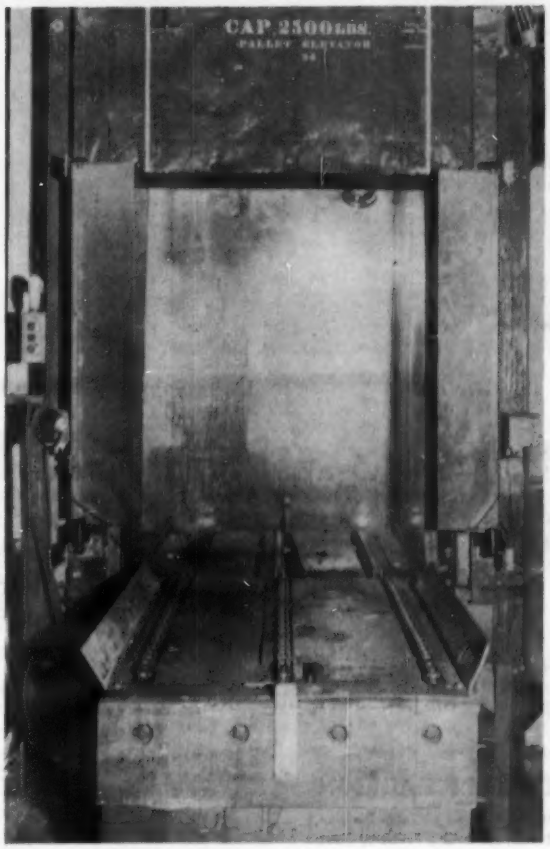
Fireproof safety doors are located on both first and second floor openings in the elevator shaft. In compliance with fire regulations, these doors are set to open only when gig is in loading or unloading position. Further, when loading, the door will open only if a pallet is on floor conveyor ready to be received.

Gig floor contains a chain conveyor, similar to the floor conveyors. It moves pallet into the gig during loading, and pushes load out again after the floor to floor trip.

Accurate leveling of the gig with floor conveyors for smooth pallet transfer is essential—particularly in food plants handling bottled products. To achieve this, the lift has an electronically controlled leveling device, activated by a limit switch, that positions the gig within ⅛ in.

LIFTER AND ITS POWER





FLOOR CONVEYOR moves loaded pallets into gig (rear). Photo-eye (left) opens fireproof safety door (top) if gig is in loading spot. Note conveyor guides that position pallet. Dual-motor hoist (top picture) raises the load.

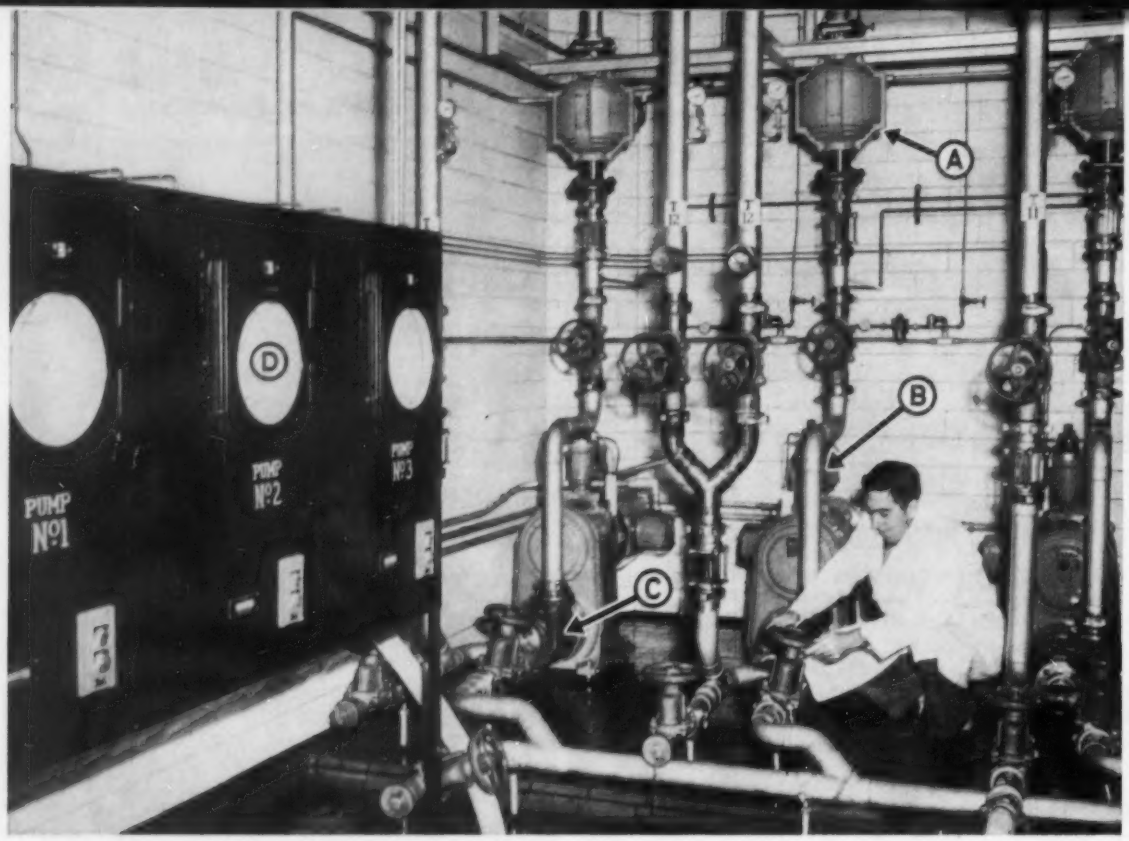
The two floor conveyors are each 66 in. long and 34¾ in. wide. They have three extended-pitch roller chains with safety plates installed between chains. Conveyor power is supplied by two, ¾-hp., 45-rpm. gear motors.

The flat chains give great stability to the high loads. And are unlikely to be damaged by loose pallet slats or protruding nails.

Fast System in Action

To start operation, fork truck driver lifts a pallet load onto the floor conveyor. This load breaks a photo-eye

(*Continued on page 188*)



Automatic Flow Control Improves Filter Performance

New sanitary magnetic meter controls pump speed to keep flow constant as pressure builds up. Boosts capacity and quality. Reduces maintenance

L. M. RICHARDSON

Manager, Food Industry Division, The Foxboro Co., Foxboro, Mass.

It has long been known that constant-rate filtration of such liquids as beer, wine, and fruit juices gives better results. And now the benefits are being realized through flow control.

The problem stems from gradual build-up of filter pressure, which lowers the rate of flow through filters. And to make up for capacity loss, the liquid has to be pumped to the filters under higher pressure. Formerly this necessitated close watch of pressure gages and on-the-spot manual manipulation of valves.

But a large Midwest brewery has come up with a simple automatic control system to assure constant filtering rate. It involves new sanitary magnetic Foxboro flowmeters, so connected into the filtering system as to control the speed of Ampco beer pumps through motor speed-adjusting Varitrol units.

Employing a unique application of well-known electrical principles, this meter is not affected by variations in viscosity or specific gravity. It involves negligible pressure drop. And most im-

Benefits Cited

New magetic flow meter pays off in six ways in brewery installation:

1. More consistent, and longer, filtration runs for efficient production and scheduling: Plate-and-frame filters, for example, don't have to be taken apart until after a long continuous run.

2. Improved quality: Filtrations can be efficiently carried out to produce a turbidity-free and more uniform-quality product.

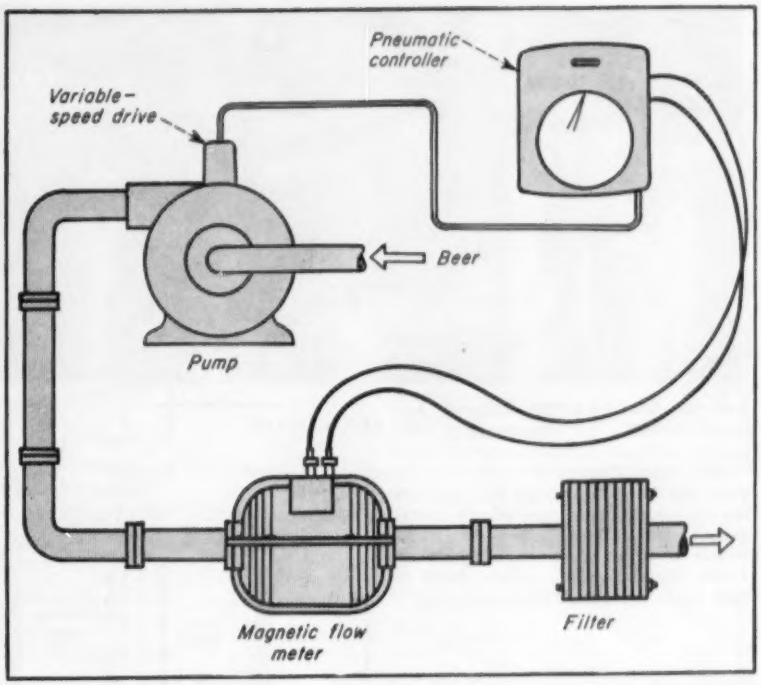
3. Better sanitation: The meter has no obstructions, crevices, or openings to catch particles in suspension. And with no moving parts, it can be cleaned-in-place without dismantling.

4. Automatic Control: Instruments simplify the task of filter operators.

5. Greater flexibility: Depending upon processes ahead of filtration, operator can easily reset flow of liquid from pump and correspondingly match flow of filter-aid slurry.

6. Freedom from maintenance: There's nothing in the metering pipe to wear or break, no pressure taps to plug or freeze, and no sealing chambers, purge systems, or complex piping.

NEW APPROACH to efficient filtration of beer is made with this advanced installation. It precisely controls rate of beer and filter-aid slurry being pumped to plate-and-frame filters in adjoining room. System comprises magnetic flow meters (A), variable-speed drives (B), pumps (C), and recording-controllers (D).



CONTROL diagram shows how new meter is hooked up in brewery to maintain constant filter-flow rate. Variations in rate of beer flow are immediately measured by meter and electrically transmitted to electronic receiving instrument. Latter, through a pneumatic control unit, then automatically adjusts pump motor's variable-speed drive to feed beer at rate set on instrument.

portant in food plant applications, it has no inner mechanisms, openings, or crevices that can contaminate the product, cause bacteria build-up, or be damaged by corrosion. Its construction meets the most rigid sanitary requirements of the food industry.

Being magnetic, the meter requires a minimum liquid conductivity for successful operation. But this may be as low as 50 micromhos, and beer is above that level.

The same is true of many other food products, such as milk, molasses, tomato pulp, and apple and grape juices.

Some foods, however, are such good insulators that the meter obviously cannot be used to measure their flows. Typical are fats, oils, and chocolate liquor.

Down to Details

This automatic filter-flow control can be employed on all leaf-type filters in "ruh" (ageing or resting) cellars, as well as on plate-and-frame filter presses used for final filtration.

Accuracy is ±1% of full scale, with repeatability of ±½% of full scale. Changing conductivity of liquid (above the minimum required) has no effect upon the meter's accuracy. So, the meter is calibrated to measure, within its range, the flow of any material that is run through it. Range change is a simple in-plant adjustment that can be made in 5 min.

Neither turbulence nor variation in "flow profile" affect the transmitter. Straightening vanes or straight runs of pipe upstream of the meter are unnecessary.

Handles Suspended Solids

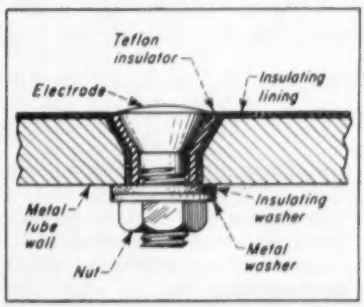
Materials containing suspended solids can be readily handled. And flow can be measured in either direction by calibrating the instrument to read center scale at zero flow. The meter operates in any position, but the line must be completely filled. Upper temperature limit for liquid being metered is 230 deg. F.

Continuous operation of plate-and-frame filters can also be achieved (as with the brewery) through the use of two stainless steel precoat tanks with vertical, propeller-type agitating units.

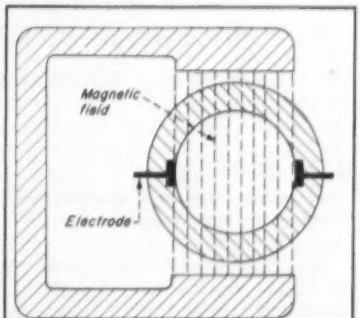
Slurry tanks can be set up to run alternately for one week, with the one not in operation set to run immediately. Slurry is fed through a pneumatically operated proportioning pump.

Totalizers can be installed in the instrument to register the output from each filtration run. A rotating cam operates a counter in proportion to flow.

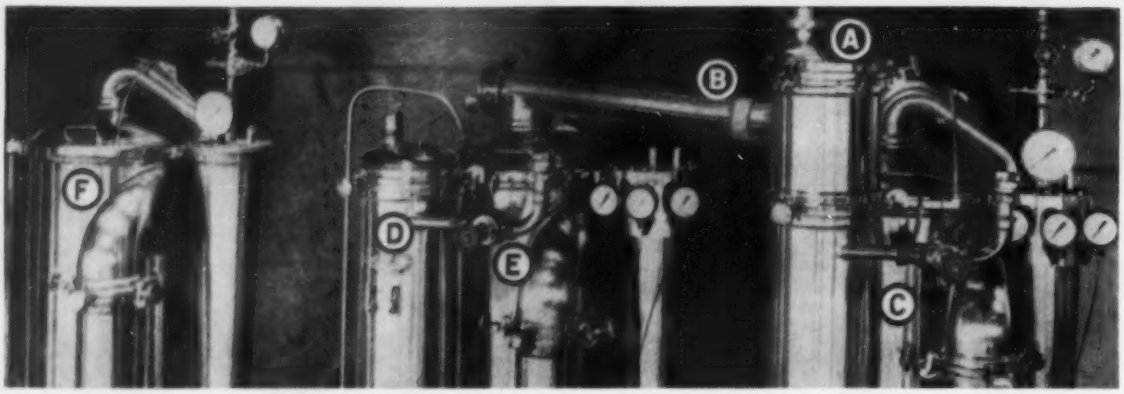
Sensing Element and Operating Principle



TEFLON plastic is insulator and pressure seal between electrode and measuring tube wall. Electrodes are inserted in holes lined with Kel-F plastic or Neoprene rubber. Around electrode are Teflon collar and sleeve. Electrode is then tightly drawn into pressure seal by a nut outside of transmitter wall.

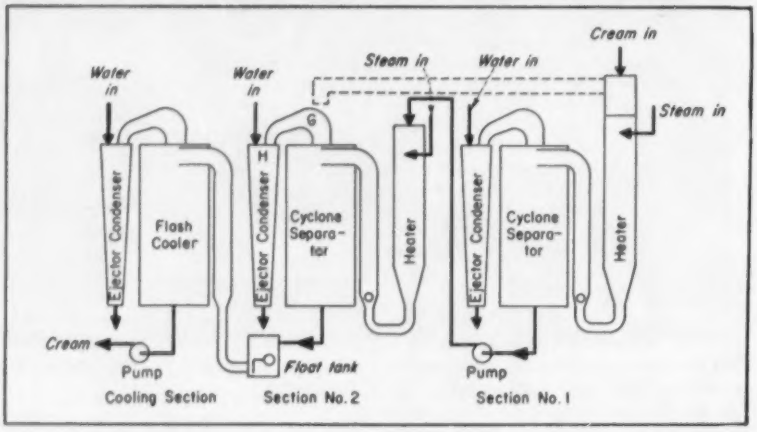


HOW IT WORKS: As flowing liquid moves through magnetic field of measuring element, it generates a millivoltage that is directly proportional to, and is a true average of, flow through meter. This millivoltage is picked up from flowing fluid by two electrodes.



TRIPLE VACREATOR (above) has three sections, two steam-using, one cooling. Cream enters heater at (A), meets steam flowing from center section (by horizontal pipe B). Mixture moves to separator (C), where cream falls to bottom, is pumped to center heater (D) and meets entering steam. From separator (E), cream flows to float tank, then to cooling section (F).

DRAWING right shows how regular triple unit is converted for steam stitching. Steam to Section No. 1 is shut off, gooseneck (G), Section 2, is removed, and condenser (H) not used. Then return pipe (dotted line) is inserted to deliver steam to Section 1.



Multi-Stage Vacreation Halves Steam Usage

Savings approaching 50% are reported when improved technique is applied to removal of off-flavors and odors from churning cream. System seen applicable specifically to other dairy products . . . liquid foods, also

J. K. SCOTT

Chief Engineer, The Dairy Research Institute, Palmerston North, New Zealand

Efficiency of the deodorizing step in butter making can be greatly increased by application of counterflow principles to the steam-stripping operation.

This improved technique permits several cost-cutting changes when incorporated in the conventional deodorizing unit.

▶ It enables increased cream flow rate without increasing steam input, thus cutting operating time with a proportional saving in steam usage.

▶ Or, cream flow and off-flavor removal may be kept constant with a reduction of approximately 50% in steam consumption.

Vacreator Popular

Of the several kinds of equipment available to remove off-flavors and odors from cream by steam stripping, only Vacreators have been used in New Zealand.

These units need large amounts of steam, especially where taint intensities are high. But if a majority of the heat can be recovered from the exhaust vapor, or from the condenser water, inefficient use of steam is not very important.

Where steam treatment is intense, however, a high degree of useful heat recovery is not possible.

In such cases, steam requirements can be considerably reduced by a method known as "stitching," which employs multiple stages and counterflow principles.

But first let us consider the opera-

These Changes Effect Big Steam Savings

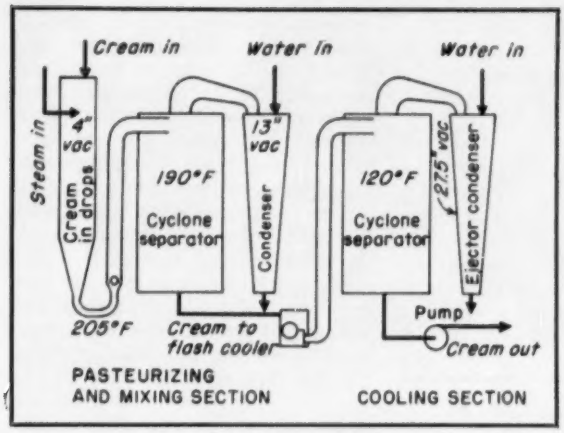


FIG. 1—IN tandem Vacreator cream is pasteurized and deodorized by heating with live steam in section at left, and vacuum cooling in other. When taint is high, large amounts of steam are required.

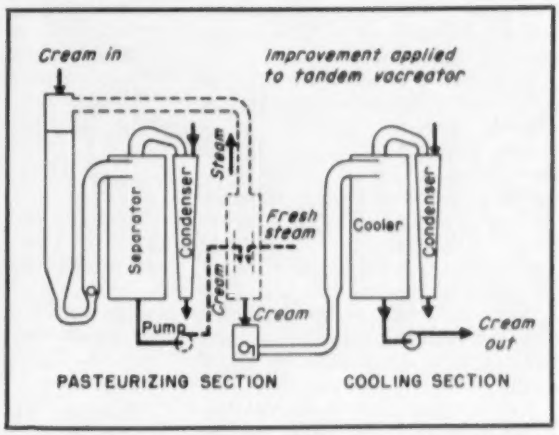


FIG. 2—IMPROVED tandem unit has second stage (dotted lines) in which fresh steam meets partially deodorized cream from first section, then goes to pasteurizer (left). With this unit, steam usage is cut greatly.

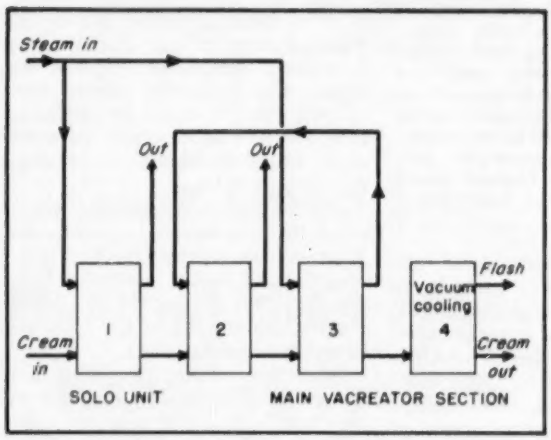


FIG. 3—DIAGRAM of two-stage arrangement employing solo Vacreator for preliminary treatment of cream, which then goes to a triple stitching unit.

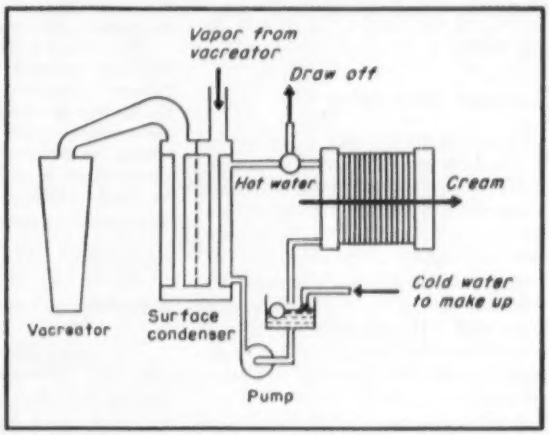


FIG. 4—HOW surface condenser ups efficiency. Water, heated by exhaust gas from Vacreator, is circulated through plate unit (right) to preheat incoming cream.

tion of a "tandem" Vacreator consisting of a vacuum pasteurizer and deodorizer followed by a vacuum cooler (Fig. 1).

Cream and steam mix in the pasteurizing chamber (left) and pass via an uptake pipe to a cyclone separator. From here, the steam discharges to an ejector condenser, and the cream enters a float tank. Cream is then pumped to a second cyclone separator where some vaporization takes place, due to the higher vacuum in this section.

When the steam contacts the cream, volatile soluble substances pass into the steam until a state of equilibrium is obtained between the concentration of taint in the steam and that in the cream.

Further reduction of volatiles cannot take place unless the cream is contacted by steam containing a lower concentration of taint. Therefore, a low final concentration can be obtained only by the use of a large amount of steam.

Stitching Applied

In the improved method, two or more deodorizers are employed, with the steam moving counter to the flow of cream. In this way, the partially tainted steam can remove volatiles from the entering fresh cream because latter's taint is sufficiently high to establish a new equilibrium.

Application of this principle to a tandem Vacreator is shown in Fig. 2. The cooling section remains unaltered, but a second steam vessel is added (dotted lines).

Fresh steam enters the second vessel and contacts cream coming from the first deodorizer, then is led, by means of a 5-in. dia. pipe, to the pasteurizing section.

Additional vessel is placed over the intermediate float tank so it can be easily removed. An important point is that only an elementary separation is required here, because any cream droplets carried over by the steam are recovered in the main vessel.

The above modification allows several changes in operating conditions. Cream flow rate can be increased while steam flow remains constant.

Another technique is to keep cream flow and taint removal constant but reduce rate of steam flow. Correct technique will depend on circumstances in a particular butter factory.

Where cream intake is too high for a standard Vacreator, the first technique will be used. But where a factory boiler is excessively overloaded, the improved equipment will be em-

ployed to reduce steam requirement.

The triple, or 3-legged Vacreator (lead photo) employs two steam-using sections followed by a flash-cooling vessel at higher vacuum.

In normal practice, there are two steam inlets. But where stitching is applied, steam to the first unit is turned off and a return pipe (dotted lines) inserted. Gooseneck (Y) is removed and condenser (X) is not used.

Pressure in section No. 2 is higher than that normally used in a triple Vacreator, which has necessitated replacement of the standard float with a larger one. And in some installations the double-seated valve has been replaced by a sleeve valve to insure stability.

Rate of steam supply to section No. 2 had to be increased slightly, so the saving is not quite 50%.

Five-leg plants consist of three steam-using sections followed by two flash-cooling units. All the steam is applied to the 3rd section, reused in the second, and used a 3rd time in the first vessel.

Condenser Overloading

Operating results over a 2-yr. period do not show any inherent disadvantage in the principle of steam stitching. However, its application to triple- and five-leg units has led to difficulties with overloading of condensers.

In the case of a triple Vacreator, the condenser has to remove slightly more steam and a considerably greater volume of gas than formerly. As a consequence, available degree of vacuum is reduced.

As rate of steam flow increases, pressure in No. 2 section increases (i.e., the vacuum decreases). A limit is reached at about atmospheric pressure, when steam commences to leak from the various seals. Thus there is a limit to the degree of treatment (unless the rate of cream flow is reduced). But the operation could be improved if a corresponding increase in vacuum were maintained at the condenser.

The above limitation is not normally restrictive, but it can be present when treating gassy or neutralized high-acid cream. Usually, condenser trouble is confined to short periods at the beginning and end of each dairying season. In these cases it is common to remove the steam stitching equipment temporarily.

Overloading of condensers is important from another aspect. The equipment is not able to operate at the reduced temperature required for treatment of cream tainted with weeds such as Land Cress.

Reducing Condenser Load

There are several ways of alleviating or eliminating condenser restriction. It is of assistance to keep the condenser water pressure as high as possible, as this increases flow with a consequent increase in vacuum-holding ability. Manufacturers of the Vacreator now supply a set of larger diameter cones which give a similar result, but at a lower water pressure.

The remaining condenser, which is idle, can be brought into operation. This is done by placing it next to, and in parallel with, the first condenser, or by using a T-shaped vapor pipe so that the exhaust steam is led to both condensers. Under this scheme the second condenser would be used only as required.

Many triple Vacreators have an Economajor* on one unit and a plate heat exchanger on the other. Function of the heat exchanger is to preheat cream with waste hot water. Condensing performed by the Economajor reduces load on ejector condenser and thus alleviates condenser restriction, as well as being an economy measure.

An arrangement which is operating satisfactorily in one butter factory employs a solo Vacreator for preliminary treatment. In it the exhaust steam carries away a considerable portion of the gas load. This is followed by a steam-stitched triple Vacreator which has considerable flexibility. (Fig. 3.)

The same conclusions apply with greater force to steam stitching when applied to five-leg Vacreators. Here satisfactory operation can be obtained only by use of a T-piece return steam pipe so that the two condensers share the required duty, or by increasing the water flow in the first condenser.

Savings Not Confined to Butter Making

In addition to their use for removal of off-flavors and odors from cream for butter making, as described here, Vacreators are employed in this country to simultaneously pasteurize and deodorize milk and ice cream mixes.

They have proved especially effective for removal of wild onion and "grassy" flavors found in raw milk in the spring and fall. By application of the techniques set forth in this article, steam economies comparable with those effected in New Zealand should be easily attained—The Editors.

Condensers Up Efficiency

Reduced steam consumption due to a more efficient process will cause the temperature rise in the condenser to be less than usual. Where condenser water is used for cream preheating, this is a disadvantage. It can result in reduced overall efficiency if the degree of heat recovery becomes less. In such cases, it would be preferable to recover heat directly from the waste vapor, which would also give relief to the ejector condenser.

Fig. 4 shows an experimental installation that has operated satisfactorily. Most of the exhaust vapor is condensed in the surface condenser (Economajor) thus heating the circulating water which is used in the plate exhanger for heating cream.

A portion of the circulating hot water can be bled off for factory or boiler use. And the cold or warm makeup water is supplied from a float-controlled tank. The author has extended the system to the use of a centrifugal heater (flash pasteurizer), which can be used when available.

Where a new plant is being installed, or new auxiliaries have to be supplied, a more rational method is to use an exchanger in which the vapors heat the cream directly. This eliminates the complexity of intermediate circulating hot water. A portion of the exhaust steam could be used to preheat the cream in a cream-heating section, and a further section could be used to heat water for cleaning or other purposes. Any steam not used for these operations could be bypassed to the ejector condenser, which would function mainly as a means for removing noncondensible gases.

A shell-and-tube heat exchanger (replacing an Economajor) has been used to preheat cream by Vacreator exhaust steam, a method which is operating quite successfully.

Predicted savings in steam and

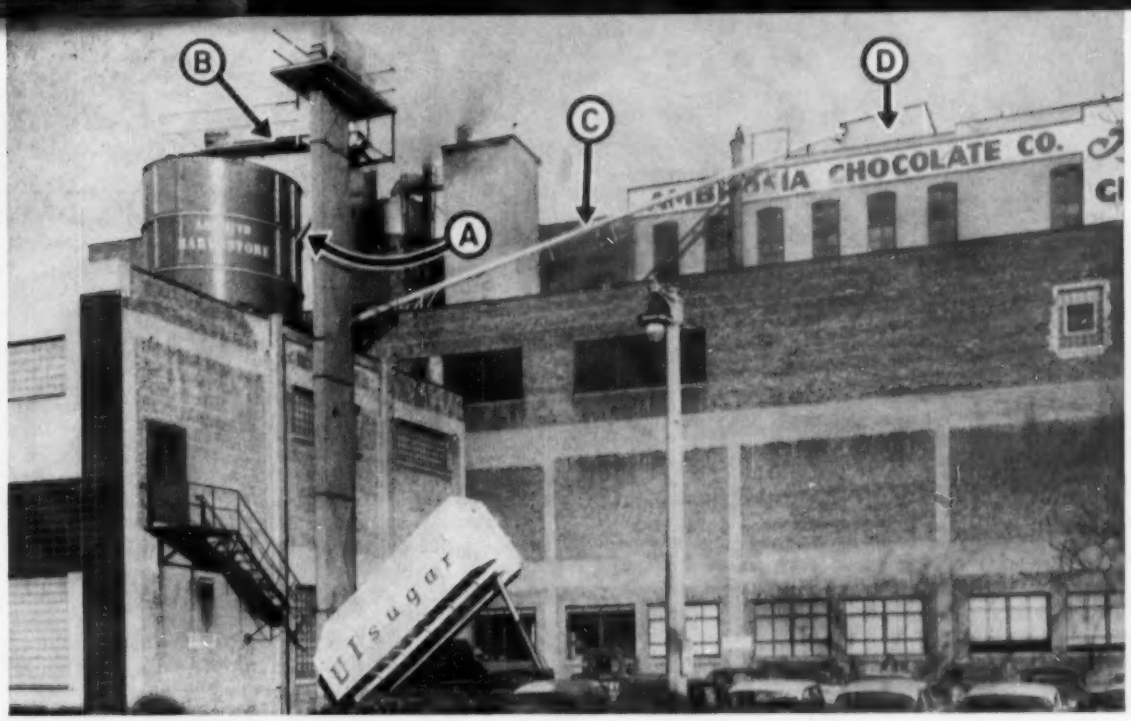
(Turn to page 188)

* A tubular surface condenser which can be placed between the vapor exhaust outlet and the ejector condenser. Although fundamentally a surface condenser, it normally is used to heat clean water (for factory or boiler use) using the heat from the waste steam. Maker: Murray Deodorisers, Ltd.

ADDITION OF STITCHING Brings Big Steam Savings in Vacreator Operations

(Based on cream preheated to 145 deg. F. by waste heat)

Type of System	Taint Level (Raw Cream)	Lb. Steam Per Lb. Cream	Savings Effected (Percent)
Tandem	Low	0.215	...
Tandem + stitching	Low	0.125	41.9
Triple	High	0.360	...
Triple + stitching	High	0.228	36.7
Five-leg	High	0.308	...
Five-leg + stitching (double)	High	0.172	44.1
Solo + triple with stitching	High	0.250	...



HYDRAULICALLY tilted truck dumps sugar into boot of bucket elevator, which feeds it, via chute (A) or worm-screw conveyor (B), into glass-lined tank. From bottom of tank, sugar is air conveyed through tube (C) to cyclone (D).

Glass-Lined Silo Heart of High-Speed Handling System

Stress-weighing, automation, extendable hose used. System saves sugar and labor. Aids sanitation and formulation

L. RUSSELL COOK and CHESTER KWIECINSKI
President and Production Manager, respectively,
Ambrosia Chocolate Co., Milwaukee

Gone is the old back-breaking and inefficient method of handling bags of sugar in our chocolate plant. In its place is an advanced system—a completely enclosed, sanitary, bulk-sugar handling set-up.

▶ **The new way not only saves us labor and sugar, but also provides better control in making up formulations during our mixing operations. Further, savings have pyramided because our new facilities permit us to purchase bulk sugar at low cost.**

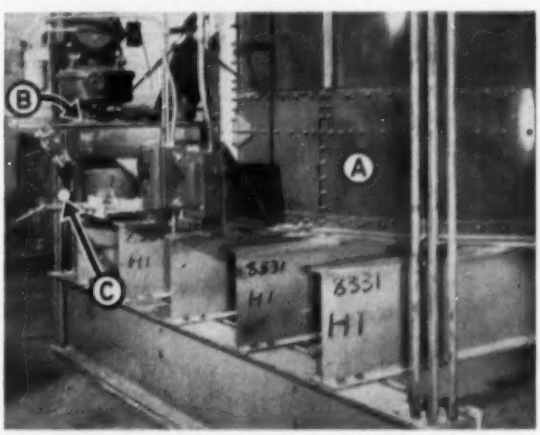
Aside from being completely mechanized, this sugar-handling system features a self-unloading glass-lined, steel farm-type silo (the Harvestore, developed by A. O. Smith Corp., Milwaukee). This sanitary tank permits us to store 220,000 lb. of sugar, while an additional 33,000 lb. are handled between tank and mixing station.

Initially, our building couldn't take the weight of the big tank. Here is how this problem was solved:

Four vertical reinforcing steel beams were first incorporated into the building structure, supported by the foundation. These beams were connected by horizontal beams at the roof level. Then, two stories below, there were placed five cross beams upon which the Harvestore tank rests.

Suspension support of these key tank-carrying horizontal beams was accomplished with sets of 1-in.-dia. vertical steel rods that extend down from the roof beams. To these rods are attached Starrett stress gages. Here, an instrument calibration is used whereby a reading of the stress on the rods indicates weight of the sugar in tank.

Specifically, our speedy sugar-handling facilities operate in this manner: (*turn page*)



BULK SUGAR is taken from storage tank (A) via bottom unloader (B). It is pneumatically carried to cyclone, then flows to mills. Weight of sugar in tank can be read on suspension stress gages—as at (C).

As a bulk-sugar truck (25,000-lb. capacity) backs up to the unloading area, it is hooked to a bucket elevator with an 8-in.-dia. Nylon hose. This hose is highly flexible—can be extended or retracted several feet—and thus readily adapts for any length working connection within its ample range.

Body of the truck is hydraulically raised to tilt position. Then the sugar is unloaded—within 25 min.—into the boot of the bucket elevator running up the outside of the building (see top photo p. 77).

The sugar is raised 60 ft. to the roof of the factory, where it is first discharged through a side chute (4 in. by 4 ft.) into the glass-lined tank (14x30 ft.). When this storage tank is about two-thirds full a Bin-Dicator sends an impulse that brings automatic energizing of a motor driving a worm-screw conveyor (12 in. by 12 ft.) for direct top feeding of sugar from bucket elevator into the center of the silo.

Sugar then goes to process via a mechanical bottom unloader. This comprises an endless chain that moves around the bottom of the tank to keep the sugar flowing toward the center, where a continuous conveyor chain carries it out.

Should the unloader fail due to a break-down, a worm-screw conveyor takes over. In this case, a Falk torque unit releases so as to cut off the power driving the unloader and, in turn, energize screw conveyor's motor.

At this point, sugar is transferred into a pneumatic conveying system for a 125-ft. delivery into a cyclone. Through cyclone's bottom air lock, sugar is then discharged into a 5,000-lb.-capacity hopper for gravity feeding via two 6-in.-dia. pipes (with permanent magnets for removing any tramp metal) into pulverizers. Slide gates at bottom of hopper may be opened to enable alternate delivery to pulverizers.

Control of fill in the hoppers is automatic through the aid of high- and low-level Bin-Dicators. These operate in this fashion:

When sugar drops below low-level Bin-Dicator, pneumatic handling system automatically starts up. Then, 30 sec. later, the motor operating the tank unloader or worm-screw conveyor is energized. Sugar is then moved from storage bin, through cyclone, and into hopper.

On the other hand, as the sugar reaches the top-level Bin-Dicator, the unloader or worm screw conveyor stops operating. And 30 sec. later, the pneumatic conveying system shuts off.

Entire handling system is controlled either manually or automatically from a central station, with a series of lights indicating units in operation. Should any handling unit break down, then the entire system automatically stops running.

Now to continue with the system: From pulverizers, sugar is carried by run-around, closed-circuit Redler conveyors for chute delivery to four 5,000-lb.-capacity weigh hoppers mounted directly above the batch-type mixers.

When these hoppers are filled, sugar is conveyor-circulated into an 8,000-lb.-capacity storage tank. Should all hoppers and holding tank fed by the Redler system also be filled, Bin-Dicators installed in chutes below pulverizers automatically cut off sugar feed to pulverizers. A half-minute later the mills stop running.

• • •

Cuts Loading Time To One-Third

With special portable conveyor, two men fill bread truck in 20 min.

R. WATKINS
West Coast Correspondent

Truck-loading time has been cut to less than one-third by Langendorf United Bakeries, Inc., San Francisco. Two men can now put 19 or 20 racks of bread aboard in 20 min. with a special portable power conveyor. It formerly took them more than an hour.

The baking firm uses 30 of the mechanical loaders in its transport operations up and down the West Coast. The specially built conveyors not only load the trucks at the plants, but unload them at distribution points.

Built on a channel-steel frame, the loader has a pair of steel wheels to support the forward end at truck-bed level and for easy portability. Inside the frame are steel tracks on which rack casters roll. The working element is an endless chain driven by a 1-hp. electric motor. This chain is equipped with metal fingers that engage two angle-iron lugs welded underneath crossmembers of each rack. And the fingers pull loaded racks up the incline onto tracks in the trucks.

Weighing 1,000 to 1,800 lb. loaded, a rack holds about 28 bread trays, each filled with 20 to 30 loaves, depending on the variety. Orders for bread are placed by the rack.

CHAIN WITH FINGERS, driven by 1-hp. motor, pushes bread racks up incline to tracks in truck. Also unloads trucks at distribution points.

The racks are side-loaded onto trucks with trailers for transport in the San Francisco area. Tractors and semi-trailers carry the bread in Southern California and the Pacific Northwest.

The portable loading conveyor varies in size according to the different bread trays and racks used at different points in the big distribution operation.

Forerunner of this loader was one using a cable, developed by Earl Sherman & Co., truck body and trailer firm in Oakland, Calif. Langendorf worked with Sherman in developing the chain loader, which it now makes for its own use.

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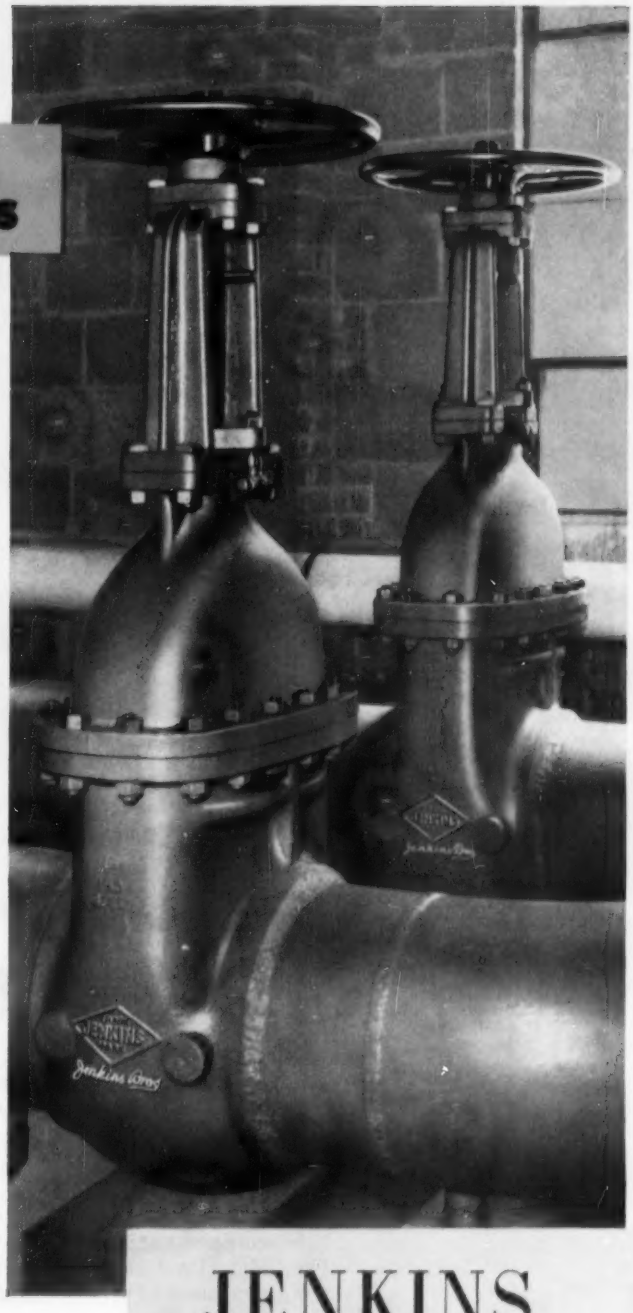

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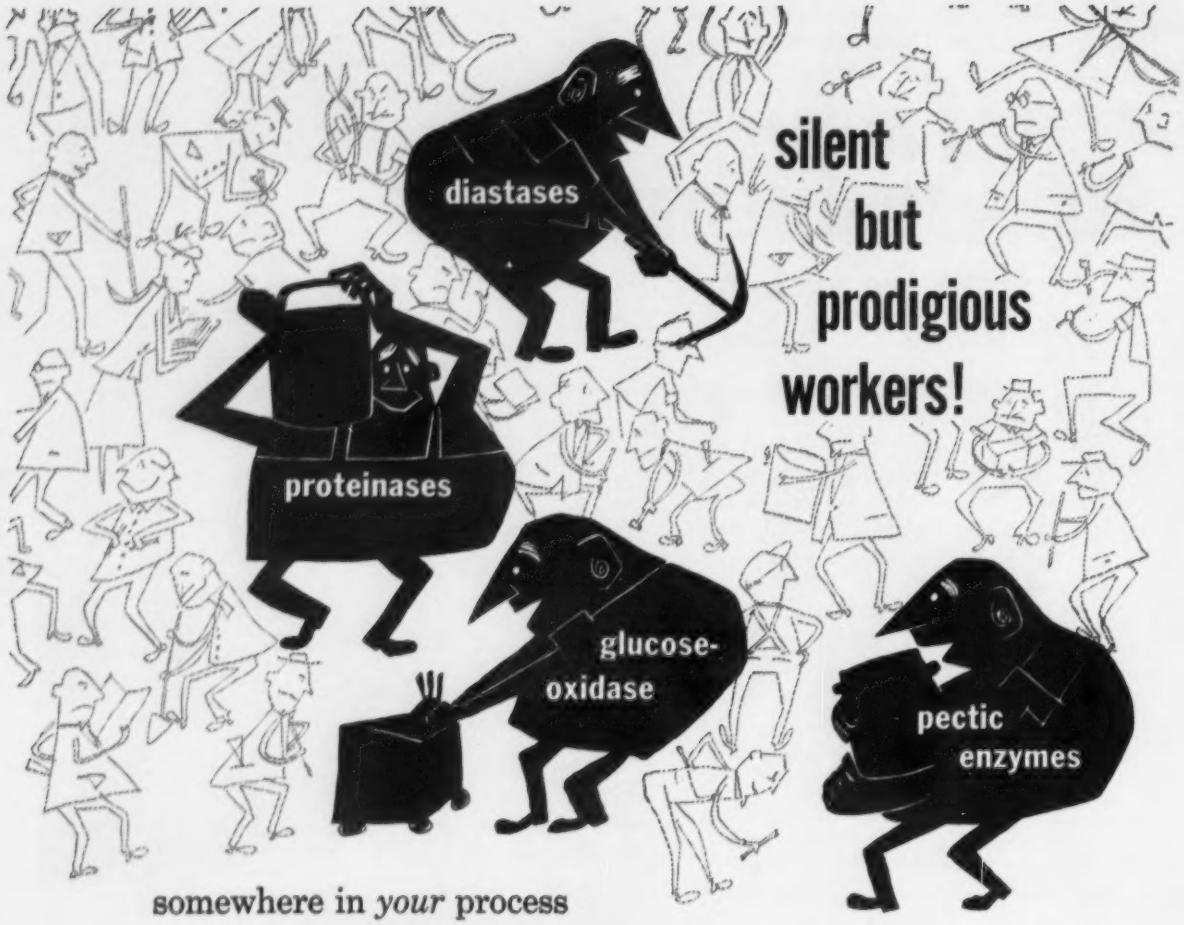

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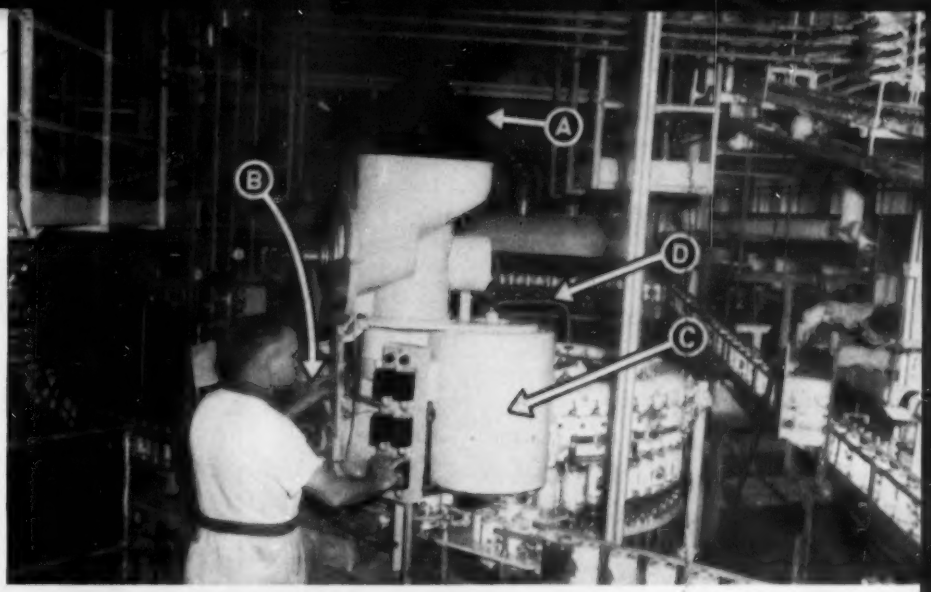
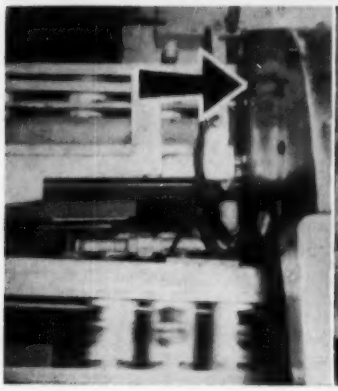
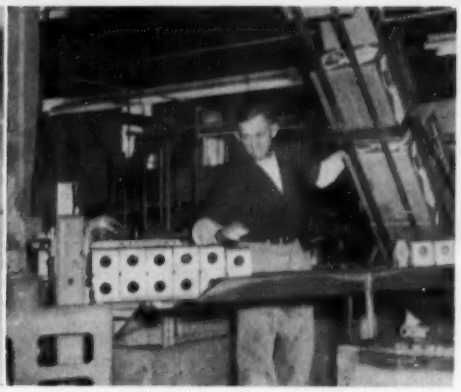
CLIFTON, NEW JERSEY



X-Ray unit (heavy arrow) checks fill of quart cans as they are conveyed to the packing station. Unit automatically ejects under-fills from conveyor line.





EMPTY CANS are chuted from washer (A) to filler (B). Capping machine (C) applies closures to cans, which are then conveyed to top deck of multi-tier pasteurizer (D).

AUTOMATIC carton-forming machine sets up the Twin-Pak cartons, into which two of the quart cans are packed. Later, four Twin-Paks and four single quarts are packed into a case.

They Engineer a Quart-Beer Line

Pabst develops newest economy-size can with "snap-off" cap. Then brewery designed 210-can-per-min. line, with advanced facilities.

FE STAFF

Until now, putting beer into quart cans has stumped brewers. But engineers at Pabst Brewing Co., working in cooperation with American Can Co., have found the solution.

Ruled out right off the bat were flat-top cans. Reason is that carbonation gas pressures would require a too heavy gage of metal plate—one that would make the cans too difficult to puncture with a conventional beer can opener. Cone-topped cans were previously tried. But Pabst adopted a new specially designed can.

This container has only a slight slope at the top, with a low-riding cap. The bottom is concave to permit proper stacking, and this can features an exclusive closure that "snaps off" without use of either can or bottle opener. Quick and easy opening is accomplished simply by prying off the cap (which is about the diameter of a quarter) with the bottom rim of another can.

To handle the new can, Pabst engineers were called upon to develop special can-washing, filling, and closing machines—along with other packaging-line equipment. Outcome was the installation of the first new quart-can line in Pabst's Milwaukee brewery.

How Quarts Are Packed

On the new quart line, empty cans are twisted into an inverted position while enroute in a chute-can feed for continuous delivery into an enclosed, stainless steel washer. Sprays of hot water wash the inverted empties as they pass through the 10-ft. long unit, which is ceiling-mounted over a double-deck pasteurizer. Water drains from the cans and drops into a V-shaped, stainless steel trough below the chute-can feed at the discharge end of the "in-line" washing machine.

The washed cans are twisted into horizontal position as they ride over three counterweighted metal rods hooked up to a microswitch. This

(Turn to page 145)

STACKER-COUNTER (*arrow*) **eliminates one operator on this high-speed tea bagger. Further economies are derived by using roll stock paper and tags, bulk reels of wire and string to form and staple envelopes.**

ANGLED machines reduce operator reaching distance. Empty boxes circulate on inner two belts of 4-belt conveyor to provide constant supply. Full containers travel around "L"-shaped packaging line on outer belts.

Labor-Cutting Machine, Compact Line—

Save Envelope Packaging $$

FE STAFF

Cost-slashing improvement in tea packaging equipment has enabled McCormick & Company, Inc., Baltimore, to double its tea bag output—with no increase in operating personnel.

Key to this production boost is an envelope counting and stacking attachment, developed by Pneumatic Scale Corp. for its envelope-forming machine.

The device consists of a series of rotating pockets, into which the finished tea bags are fed. Each chamber will hold up to 16 bags, and a mechanical counter advances pockets when the desired number of envelopes has been stacked. Now, operator need only remove stacks from the pockets as they pass in front of her, inspect bags, and place them in cartons.

By eliminating hand stacking and counting, the unit has cut machine operators from two to one, thus halving labor costs for packaging this product.

To take advantage of this money-saving device, McCormick has redesigned its packaging line and doubled the number of bagging machines. Resultant layout shows great economy of floor space.

Compact Machine Arrangement

A special, merry-go-round conveyor system has been devised to supply the line with empty cartons and to remove full containers. Packaging machines have been turned at a 45-deg. angle to these carriers—to shorten reaching distance and up operator cartoning speed.

Conveyors are arranged in the form of an "L", with machines ranged along both legs. A single, combination box maker and liner (Peters), placed near the end of the long leg, turns out enough foil-lined cartons (120 per min.) to supply all the machines. Containers feed onto the merry-go-round and circle both legs of the "L" until they are picked off by the machine operators for the hand-filling operation.

A photo-cell device, which couples to a positive feed arm, is now being installed at the conveyor entrance. It will push empty cartons onto the rotary conveyor whenever there is a space between boxes.

Operators place full cartons on a second conveyor, which parallels the empty box carrier. They travel around the "L" to a discharge point, and pass to a box closer (Peters) that folds liner and tucks in the box top. An overwrapper (Package Machinery) encloses cartons in cellophane before they are finally cased.

How Packager Works

Tea baggers, each driven by a 2-hp. motor, are rated at 175-185 envelopes per minute. McCormick runs the machines at 165, and turns out about 65,000 bags per machine in each 8-hr. shift.

Blended tea is supplied from 1-ton hoppers, located on the floor above the bagging line. Two machines are coupled to each hopper.

Product drops from storage to small hoppers on the packagers by gravity. Bag fill is controlled volumetrically by passing tea through an inclined tube. Pitch of the tube determines rate of flow, and thus bag fill.

Each machine contains two forming and filling heads that work simultaneously.

Bags are formed continuously from a roll of paper that is coated with heat-sealing compound. Paper is folded around a flat funnel, then sealed vertically along the edge. Horizontal seals form the separate packages. A flapper valve on the funnel is timed to open and drop charge of tea into the paper tube when a horizontal seal is made.

(*Turn to page 188*)

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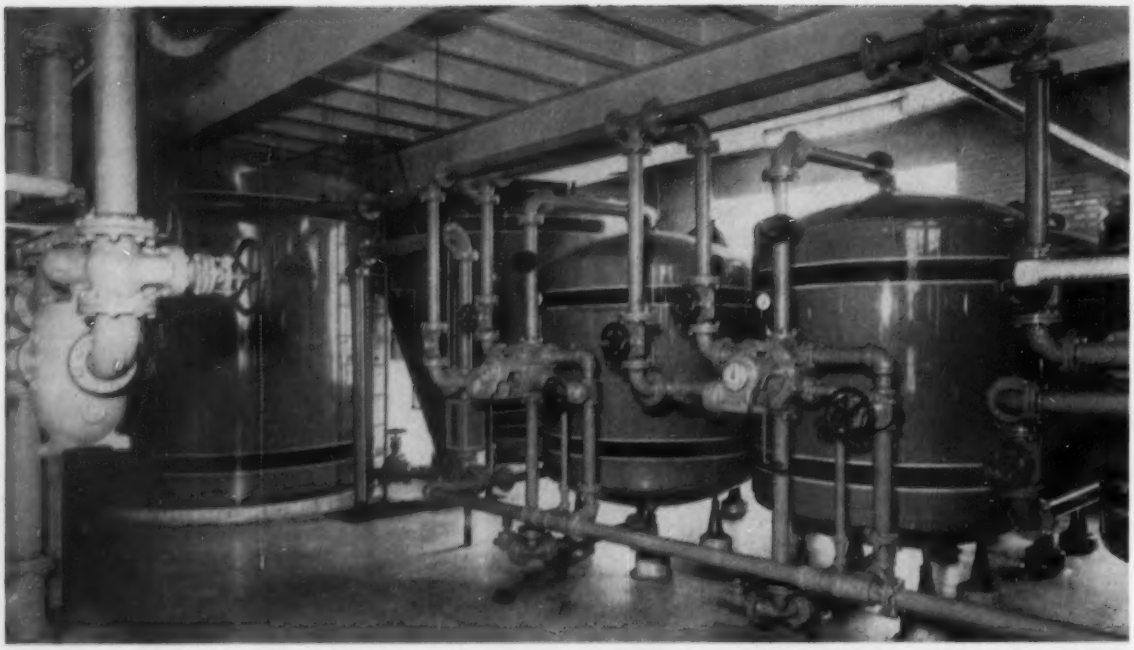


TREATING SYSTEM in Midwest soft drink plant comprises precipitators (background) and sand and carbon filters. Resulting water is sterile, crystal clear, low in alkalinity, and free from tastes, odors, organic matter.

For Better Beverages Treat Your Water Supplies

Even though the water is soft and obtained from a municipal source, it may contain trouble-producing organic matter and bacteria. And if it's hard you are apt to have flavor problems and bottle washing difficulties

HERBERT B. SLIGER
The Permutit Co., New York

As bottlers concentrate on more efficient ways of producing better beverages, it is not surprising that greater attention is focused on water quality.

For water forms up to 95% of the product, and contamination of the supply, for even a short period during the busy season, could easily result in losses greater than the cost of a complete system for treating the water.

However, many bottlers still consider their city water supplies satisfactory for beverage making. Such an assumption is usually a dangerous one, because municipal health department standards regarding alkalinity, taste, odor, and organic matter are not as stringent as those necessary for production of top quality beverages.

Case Histories Prove Point

For an example of the damage that organic matter, permitted in low amounts in city water supplies, can inflict, take this experience of a bottler of cola type drink: A gelatinous mass formed near the surface of his beverage approximately 2 hr. after bottling. Miscroscopic examination showed the mass to be composed of concentrated oils and organic matter. The latter had caused the oils in the flavor concentrate to separate out and carry the organic matter to the surface.

This condition not only caused a halt in production but also necessitated recalling and discarding hundreds of cases of the beverage from distributors.

Another instance involved an offensive taste and odor in the finished drink. An examination showed no suspended matter. Also, this particular bottler was the only one in the city effected.

Here, the investigation finally centered on the fact that the plant was located in a section that had a very old distribution system. The off-taste and odor were then found to be due to the poor condition of the water mains in that area.

A further example was a bottling plant operating on city water and producing a cola beverage and club soda. As the water was low in al-

kalinity, only sand and carbon filters were used.

When this plant purchased modern treating equipment, basically as insurance in case of a disruption of city water quality, the operator was very gratified to notice an immediate improvement in flavor of the cola beverage. Further, the club soda now held its carbonation much longer, and the production supervisor reported complete elimination of foaming.

Stringent Requirements

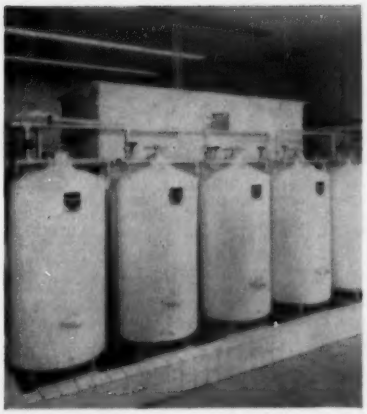
To be suitable for beverage making, water must be—

1. **Completely sterile.** Otherwise bacteria may grow in the beverage and spoil the drink.
2. **Crystal clear.** For appearance is a large factor in the sales appeal of any beverage. In addition, dirt in very small quantities causes foaming, poor carbonation, and other bottling difficulties.
3. **Free of tastes and odors,** which may change the characteristic qualities of the beverage.
4. **Free from organic matter or plant life.** For these will cause spoilage, rings in the bottles, and carbonation difficulties.
5. **Uniformly low in alkalinity.** For flavors used in most carbonated beverages are acidic in nature, and alkalinity in the water will react with the acid present, causing loss of flavor and a flat-tasting drink.

Treatment Costs Are Low

Proper treatment of water for beverages is surprisingly cheap.

First, let us consider the cost of



THIS compact precipitation plant gives Mexican bottler complete control of water supply.

labor. Most bottlers report that from 30 to 60 min. of attention a day will handle all necessary operations, and this time can easily be given by existing plant personnel.

Assuming a plant requiring 2,000 gal. of water per hour for bottling purposes, total operating cost would be:

1. Chemicals normally used are ferrous sulfate, lime, and HTH as a source of chlorine. Average dosages per 1,000 gal. of water are: Ferrous sulfate 0.4 lb.; lime 1 lb., and HTH 0.12 lb. An average figure for chemicals per 2,000 gal. of treated water would be $0.192.

2. Electric power is required to run the transfer pump, chemical feed tank agitators, and agitator on treatment unit itself. This would amount to approximately 4 kw. per hr. and cost $0.14, giving a total cost for chemicals and power of $0.332.

If the plant is filling 12 oz. bottles, 2.25 gal. would be used per case giving a production of 890 cases per hour. Cost for water treating would amount to only $0.000415 per case.

Investment in equipment would approximate $16,000. Based on a life of 20 yr., and interest at 5%, this would run to $0.00075 per case, giving a total cost of $0.001165. Obviously, this affects overall product costs very slightly.

Expense of producing soft water for bottle washing is also low. In a plant of the size under discussion, approximately 6,000 gal. per hr. would be required to wash the necessary bottles. If we assume a water with 10 gr./gal. hardness, the only chemical required would be common salt, cost of which would run $0.000302 per case.

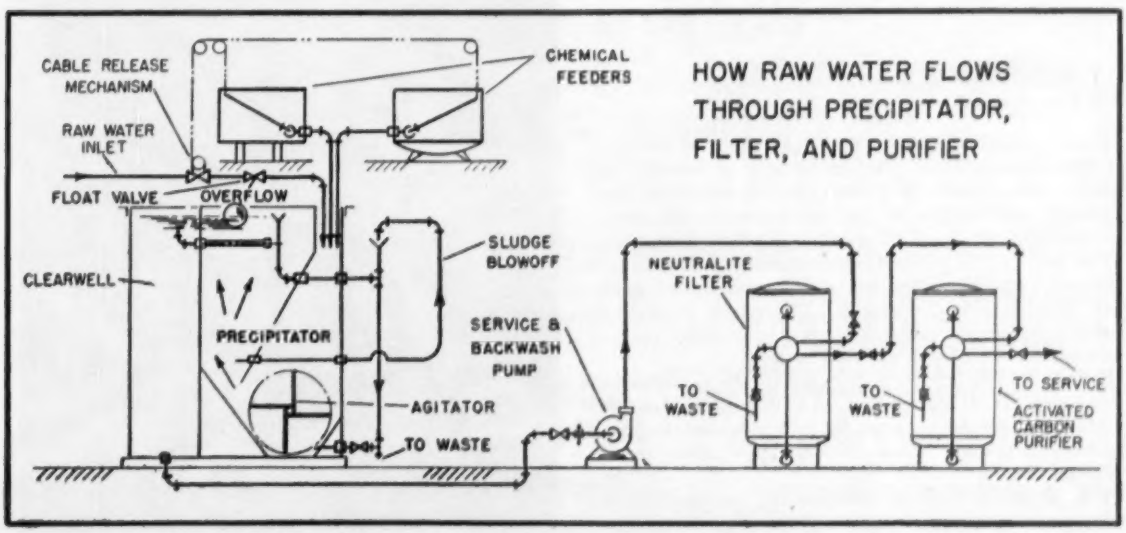
Investment in equipment would be approximately $6,000. On the same assumptions regarding life and interest rate, cost would be $0.000383 per case, giving a total cost of $0.000685.

Water Treating Equipment

The modern water-treating plant in the beverage field consists of the necessary equipment for coagulation, de-alkalization, sterilization, filtration, and taste-and odor-removal.

Treating chemicals consist of chlorine for sterilization, either in a powdered or liquid form, and a coagulant, normally ferrous sulfate to gather particles together in the water and form a floc that enmeshes the suspended matter.

A third chemical is added to adjust the pH for proper coagulation and, where de-alkalization is needed, to



SCHEMATIC of treating plant for bottling water. Note feed tanks (top) in which chemicals are prepared, then supplied to precipitator as needed. Also observe precipitator's special agitator that imparts rolling motion to the water.

reduce alkalinity of the water. It normally is lime hydrate, which reacts with the calcium bicarbonate to form calcium carbonate. This chemical is very insoluble and precipitates out, then is captured by the sludge blanket of the coagulation and de-alkalization unit.

Our company's Permutit Precipitator consists of a mixing and coagulation zone, a sludge filter zone, and a clearwell zone.

Two chemical tanks are provided. One is equipped with a motor-driven agitator, used for feeding lime suspension and chlorine. The other is normally used for the coagulant solution. Both have corrosion-resistant linings.

In the first zone, water is mixed with chemicals that are supplied from two feed tanks. A horizontal agitator imparts a slow rolling motion to the mixture to promote formation of large and tough floc particles. Sufficient detention time is provided for intimate contact of the water and sludge particles, and to allow for completion of the chemical reactions.

Water then passes up through the sludge filter zone. This has a cross-section of increasing area which causes the movement of water and sludge to decrease as they flow upward. Floc particles are left behind at a separation level determined by the density of the particles.

Contact and filtration through the suspended sludge blanket: (1) causes chemicals to react completely, and (2) removes turbidity caused by organic matter, bacteria and precipitated chemicals.

The clearwell stores treated water in sufficient amounts to: (1) Permit backwashing of the filter and carbon purifier which follow the Precipitator; (2) provide ample time for the chlorine to act before it is removed in the carbon purifiers, and (3) supply adequate water at the pump suction.

Filter and carbon purifiers have corrosion-resistant linings and are equipped with multiport valves. Each of the latter replaces a nest of individual valves previously required for backwashing, rinsing, and filtering. The valve can only rotate in one direction, eliminating the possibility of performing the washing and rinsing procedure in the wrong sequence. It also saves considerable time and improves the appearance of the equipment considerably. Moreover, filters and purifiers have removable heads to aid in loading and unloading the charges.

Bottle Washing

Most bottlers recognize that soft water is required for their boilers. But they sometimes fail to realize its critical application to the bottle washing process.

No matter how much care is taken in the washing operation when using hard water, a film of insoluble material is deposited on the bottles, leaving them streaked and dingy. This kind of deposit can also interfere with the filling operation, being one of the causes of foaming and loss of gas. In addition, hard water consumes great quantities of chemicals used for washing.

A zeolite softener will produce a completely soft water, and is an absolute must for good washing results. It will insure crystal clear bottles with much less work and half the detergent required with hard water. Further, soft water protects against scale in the plant boiler and heating coils of the bottle-washing machine.

The zeolite water softener is extremely simple to operate. Water flows into a closed tank containing a bed of zeolite. This granular material removes the hardening elements and substitutes sodium ions. The soft water then flows to the bottle washing equipment, and other locations, as desired.

The softener periodically requires regeneration with concentrated brine solution, made from common salt. Regeneration is effected by turning

(*Turn to page 154*)

• • •

Clarifies Oil Quickly To Up Fry Quality

RAY BLOOMBERG
Special FE Correspondent, Seattle, Wash.

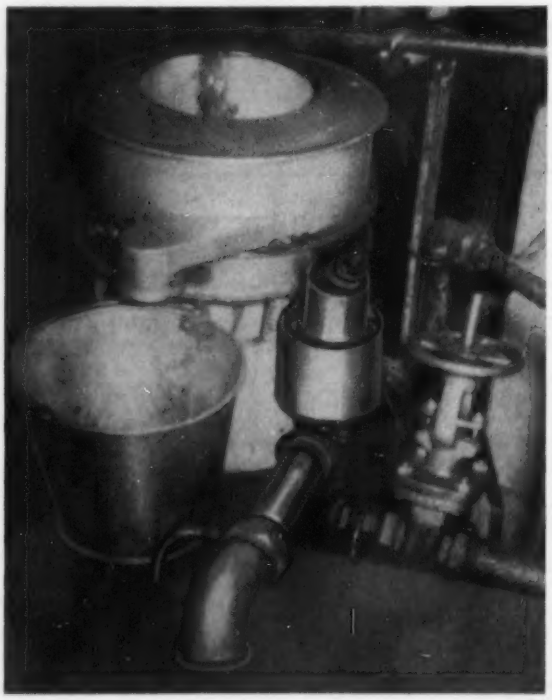
Time required to clarify a 2,500-gal. batch of frying oil has been reduced from 2 hr. to 18 min. at Stokely Van Camp, Zillah, Wash. As a result, the oil is clarified more frequently, free fatty acids content is considerably lower, and quality of the frozen fried potato products is improved.

This process and product improvement is achieved with a gyratory separator that has a 200-mesh metal screen cloth with 0.0029-in. openings. The screen is made of market-grade stainless steel, and all other contact parts of the separator are of 316 stainless metal.

Hot oil at 300 deg. F. is pumped to the separator, installed atop the oil storage tank. And the filtered oil flows by gravity to the fryer—or to the storage tank during general cleanup periods. Flow through the separator is at a 140-gpm. rate.

The separator itself is self-cleaning, keeping routine maintenance to a minimum.

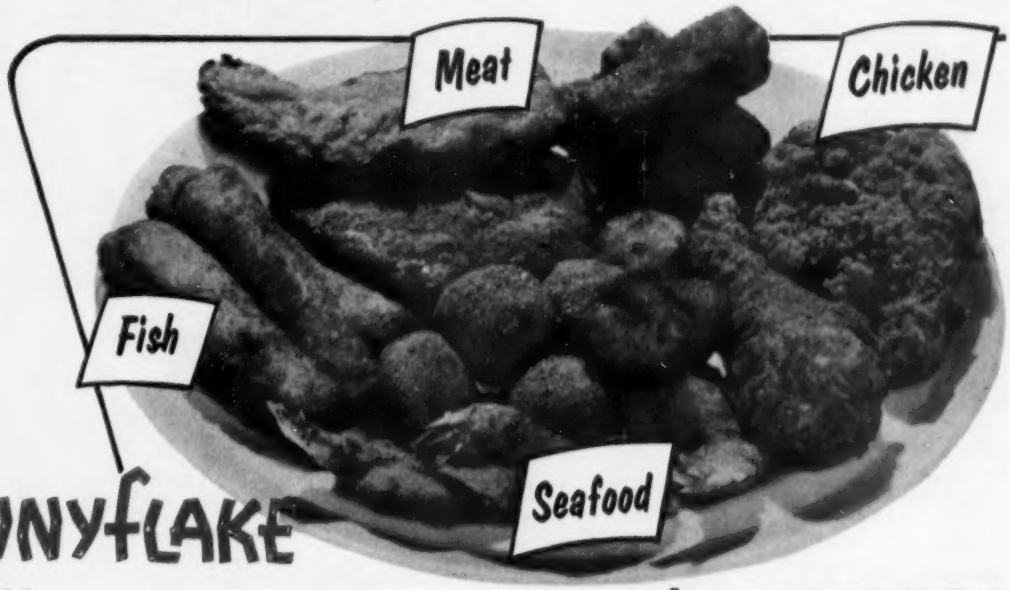
The Stokely unit is an 18-in. Model G-10-5 Sweco, made by Southwestern Engineering Co., Los Angeles, Calif.



GYRATORY separator at Stokely plant screens frying oil at 140-gpm. rate, is self-cleaning.

FROZEN BREADED PROCESSING

for Quality Control at Low Cost



downyflake offers YOU 4-Star Breader SERVICE

Downyflake's unique 4-Star Breader Service is unequalled in the industry. It is geared to help processors make more money with breaded frozen foods. Back of it all is a team that, working in every phase of your operation, makes for a better product at lower cost:

★ RESEARCH

We maintain one of the best food laboratories in America . . . conducting constant research to help develop a breader mix that meets your needs for better taste, pick up, color, absorption, prevention of blistering, etc.

★ BREADER and BATTER MIX

With over 37 years of mix processing leadership, we can guarantee you dependable uniformity and top quality on both products.

★ LOW PROCESSING LABOR COST

We offer you the most complete line of automatic equipment for dipping, breading, frying, cooling, etc., which we design and manufacture.

★ FIELD TECHNICIANS

Practical men, trained in the use of breader mix and automatic equipment, work with you constantly in your own plant, backing up our guarantee of top performance in mix and equipment.

"to the Kings Taste"

This service combines to help you achieve a finer product manufactured at lower cost . . . the true basis for making money on processed foods. Let us send you more detailed facts today!

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- ☐ **I'd like to talk to your technical consultant.**

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City _____ Zone _____ State _____

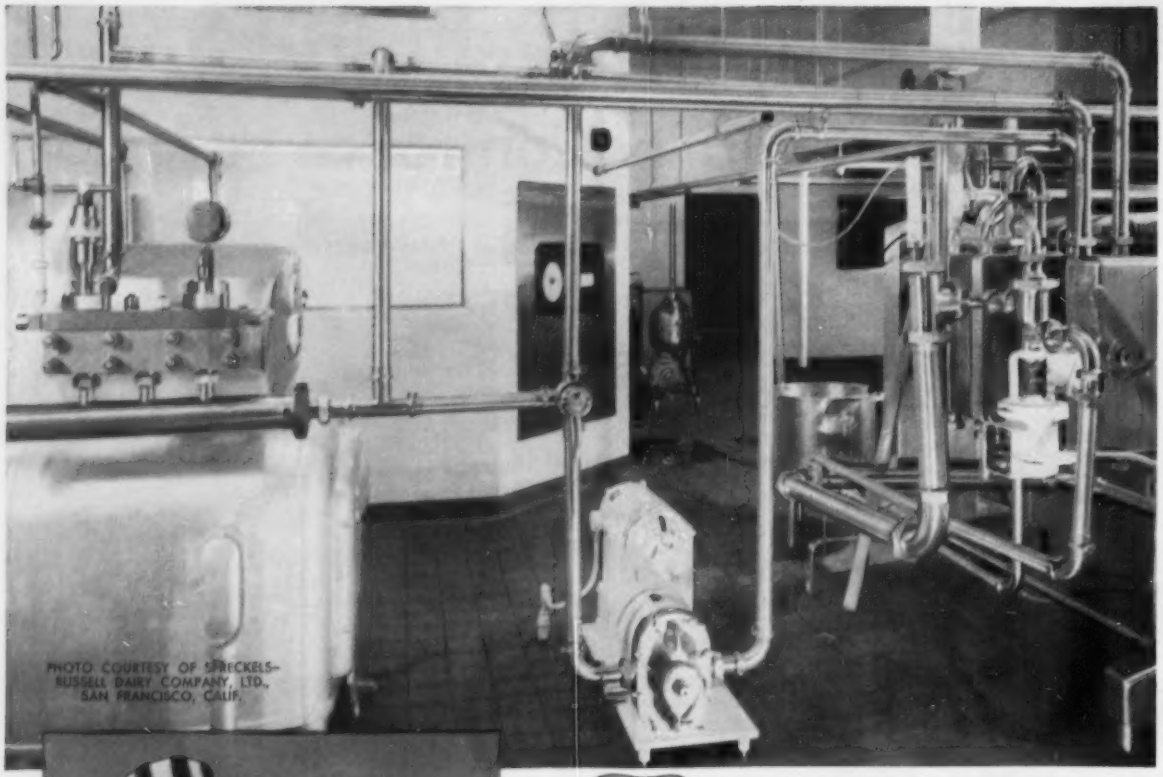

PHOTO COURTESY OF SPRECKELS-RUSSELL DAIRY COMPANY, LTD., SAN FRANCISCO, CALIF.

Special short toggle clamp and hand tool used for permanent "C-I-P" lines, preventing accidental opening or tampering with joints.

Tri-Clamp tee—one of complete line of fittings available in 1", 1½", 2", 2½", 3" and 4" sizes.

Tri-Clamp 90 degree sweep ell available in all sizes.

Tri-Clamp Three-way lift type plug valve. Other valves available in complete range of types and sizes.

. . . another dairy installs

Tri-Clover Stainless Steel

CLEANED-IN-PLACE LINES

. . . this time it's Spreckels-Russell, progressive San Francisco dairy that has recognized the time and money-saving advantages of using TRI-CLAMP Sanitary Stainless Steel Fittings, to provide leak-proof, cleaned-in-place liquid lines.

Here, as in other dairies throughout the country, it was a simple matter to utilize existing sanitary fittings, and to extend lines through the use of simple Tri-Clamp adapters and snap-on clamps. The result is a complete, cleaned-in-place installation, which can be easily and quickly disassembled whenever necessary.

For further details on the complete line of TRI-CLAMP fittings, made only by TRI-CLOVER, write for literature.

LADISH CO.
Tri-Clover Division
KENOSHA WISCONSIN

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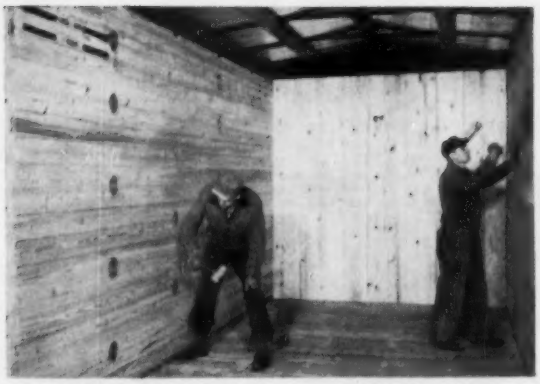
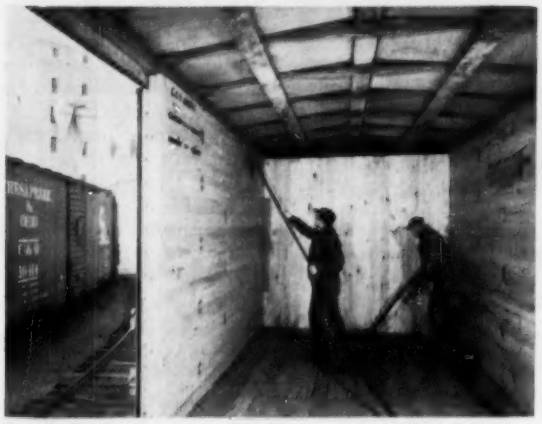




POUNDING the car's sidewalls (top photo) to loosen any insects or grain particles is first sanitizing step. Dislodged material falls to the floor and is swept out. Then, two-man crew (above) finishes the job by covering every inch of car surface with cleaning tools. Entire operation takes about 40 min.

SPECIAL "CLEANING TRACKS" bring cars right up to vacuum equipment—cleaning tools, hoses, and centrifugal exhauster. Refuse enters 3-in. pipe-line (right) through spring-loaded valves, then goes to plant's low-pressure collecting system via dust separator in nearby building.

FINAL CHECK before sealing loaded car is probe test by lab personnel. Samples are kept for one year for comparison with others taken at shipment's destination.

Rail-Car Sanitation Clinches Malt Quality

Trackside vacuum setup speeds thorough cleaning of box cars to protect quality

KEEPING its finished malt contamination-free in box-car transit is a critical phase of quality control at Rahr Malting Co., Manitowoc, Wis.

Since 95% of its annual tonnage (18 million bu.) is moved by rail, this progressive company has gone to unusual lengths to get complete sanitary protection. And according to Rahr, customer and company satisfaction has well repaid the effort.

Initially, all cars must pass rigid inspection by railroad personnel who check them for mechanical defects, odors, spots, and weather- and water-tightness. After "preliminary" inspection, they are ticketed "OK MALT"—equivalent to flour carriers (Class I).

On arrival, cars are again inspected by plant and laboratory personnel before being accepted. Then, they move on to the "cleaning tracks."

Employed here is a heavy-duty industrial vacuum-cleaning system built by U. S. Hoffman Machinery Corp.,

(*Turn to page 175*)

Antibiotic Cuts Defects In Processed Cheese

Nisin obtained in England from strains of cheese culture inhibits growth of gas-producing bacteria. It may find uses in other foods

McGRAW-HILL WORLD NEWS

London Bureau

Control of clostridia which cause blowing, putrefaction, and liquefaction of processed cheese is now possible through addition of a small quantity of nisin at time of processing.

The inhibitory action of the antibiotic on clostridia led workers at the National Institute for Research in Dairying (Reading, England) to investigate possibilities of using it in the manufacture of original and processed cheeses. These investigations proved very successful, especially in the case of processed cheese.

Researchers at Alpin & Barrett, Ltd., Yeovil, Somerset, England, later succeeded in developing and producing highly active preparations on a commercial scale. These are transferred to skim milk cheese curd by a special process that renders the nisin extremely stable.

The cheese contains approximately 10,000 Reading units (RU) nisin per g., and is marketed as Nisaplin Brand Special Cheese. It should be ground in the same manner as the other cheese, and may be incorporated at any convenient stage up to, and including melting, according to H. B. Hawley, research director of Alpin & Barrett.

Actual conditions of melting are not important, and temperatures up to 204 F. may be used without significant loss of nisin. Phosphate melting salts and pH of 6.5 or lower are preferable.

If citrate emulsifiers, or emulsifiers containing a large proportion of citrate are used, nisin content may have to be increased slightly. Citrates do not destroy nisin, but they have a definite stimulating effect on clostridia. In this way they raise the threshold at which the bacteria are inhibited.

With a phosphate buffer and pH of 6.5 or lower, 1½% of the special cheese is sufficient. This gives a nisin titre in the processed cheese of approximately 150 RU/g. If citrate salts are used, however, it may become necessary to raise the cheese quantity to 2%. And, under particularly favorable conditions 1% may be adequate.

Obtained From Lactic Culture

Nisin is a low molecular weight protein which is digested by the intestinal enzymes. It is produced by certain strains of the cheese starter organism *S. lactis*.

The natural origin, protein nature, lack of toxicity, and absence of medical applications make nisin an ideal inhibitory substance for use against clostridia in food stuffs. In cheese and processed cheese products it does little more than tip the delicately poised biological balance against the clostridia metabolism.

It is not a single protein substance but consists of a number of closely related nisins with slightly different antibacterial spectra and pH-temperature rages. The abundance ratio of these nisins varies with conditions of growth of nisin-producing streptococci and with the sub-strain used. Consequently, the process of manufacture has to be carefully controlled to obtain a product to match the particular requirements of the processed cheese manufactured.

Not a Cure-All

Properly manufactured processed cheese should contain only the spores of anaerobic (clostridia) and aerobic (bacilli) bacteria. It is the former that cause defects in the product, and these can be effectively combatted by nisin. Experience shows that nisin-resistant clostridia are rare, but they may be encountered if blown-cheese containing sub-inhibitory amounts of nisin is repeatedly reprocessed.

Bacteria that gain access to the cheese after processing may sometimes cause trouble. These may be air-borne (usually sarcinae), or bacteria contaminating the packaging machines or other utensils. But the commonest source of such contamination is the original cheese.

Such contaminants are usually lactobacilli, micrococci, and streptococci. Their interactions may be extremely complex. For example, *L. plantarum* destroys nisin, whereas *L. casei* does not. If both are present, the *L. casei* protects the nisin from destruction. Other bacteria that do not destroy nisin, protect clostridia from it's inhibitory action.

Sanitary Practices Needed

These defects are all amenable to control if proper attention is given to plant sanitation, particularly to elimination of utensils or implements common to both the original and the processed cheese.

In the case of portion and block processed cheeses, such contaminants can often be controlled by proper attention to filling methods and temperatures. If the melted cheese is really hot, and in a thoroughly fluid condition, it is deposited as a homogeneous portion in which bacterial growth will be minimized.

Traces of aluminum can sometimes react with constituents in the cheese and produce hydrogen which causes lifting of the foil with or without forming pockets on the surface of the cheese. This only occurs with foils that have defective protective coatings.

Experience with use of nisin in processed cheese is growing rapidly and many processors are finding it as indispensable as melting salts in formulation of their products.

Development of a process for manufacture of pure nisin has now advanced beyond the pilot plant stage. This product is expected to be released to the canning trade and other food processors in the near future.

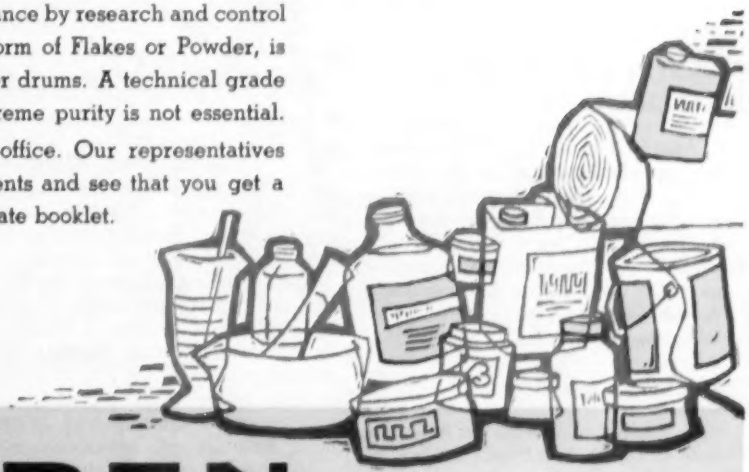
Protect the high quality of your product

with Heyden SODIUM BENZOATE

Since all foods and beverages may contain bacteria or molds in varying amounts, a threat to the quality and reputation of your product is always present. To protect flavor, freshness, appearance and taste, Heyden Sodium Benzoate can be used as a safe, effective preservative. It's economical insurance; just 1/10 of 1% will help keep margarine, soft drinks, jellies, juices, condiments and other products from spoiling.

Heyden—a long established producer of Sodium Benzoate—maintains highest purity and uniformity through modern specially designed equipment and close surveillance by research and control chemists. The U.S.P. Grade, in the form of Flakes or Powder, is available in 100, 50 and 25 pound fiber drums. A technical grade is supplied for applications where extreme purity is not essential.

Contact the nearest Heyden sales office. Our representatives will be glad to discuss your requirements and see that you get a copy of our informative Sodium Benzoate booklet.



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For more data, circle this page number on card at back →

MANY dietetic confections are now available. Marshmallows, nougats, and frappes gain low-calorie status by increased bulk. In other candies, sorbitol, mannitol, Sucaryl and saccharin replace conventional carbohydrates.

DIETETIC FOODS

★ Their Status ★ And How To Make Them

Revealing points and formulas to aid and guide you in the manufacture of a variety of low-calorie foods and confections*

JUSTIN J. ALIKONIS
Director, Al-Chem Laboratory, Inc., Bloomington, Ill.

As a food technologist I have been hesitant about writing on low-calorie foods. For anyone buying them is actually admitting lack of will power.

Nevertheless, there definitely is a place for dietetic foods for those people who must go on low- or high-protein, low- or high-fat salt-free, or low-carbohydrate diets.

Low-Calorie Products

A number of low-calorie foods are now being marketed to a limited extent. Examples are:

Beverages: Sorbitol or artificial sweeteners are used in soft drinks, in place of sugar. Strictly speaking, the beverages are not low in calories. But they are advertised with the notation "No Sugar", (meaning they contain no cane sugar) to convey a psychological effect.

Puddings: Low-calorie puddings are of the cooking (not instant) type. Sugar is replaced with Sucaryl[1] or saccharine. As a gelling agent, Irish moss[2] is used.

Problem in such puddings is to provide a clump-preventing diluent for the gelling agent that does not add too many calories. Employed are rice and soy flours. Suitable, too, are the new dispersible-type milk powders.

Salad dressings: Low-calorie dressings of the mayonnaise type require a hydrocolloid as a filler or binder to hold the starch paste together with reduced oil level.

Since federal and some state laws regulate salad dressing and mayonnaise formulations, low-calorie products must be called by trade names such as "Chef's Dressing", "Slim Dressing," etc. Oil level may be 10% or lower, but the lower the oil, the less palatable is the starch-oil mixture.

Salad dressings of the vinegar-oil type are sold as low-calorie foods, with gums providing the thickening. However, as with carbonated beverages, low pH's hydrolyse the gums (including pectins).

Jams and jellies: Here, low-methoxyl pectin, Irish moss extract, agar, or guar gum are employed as gelling agents. All or part of the sugar is replaced with Sucaryl or saccharin sweeteners. Usually 1 to 2% of gelling agent is used, and 30 parts of sugar are replaced with 1 part Sucaryl.

Imitation maple syrup contains a mixture of sorbitol (90%), mannitol (10%), and imitation flavor. As a thickener, CMC (carboxymethyl cellulose)[3] is used. The syrup can be eaten by diabetics. It is pleasant to consume, giving good mouth feel.

Cake mixes: Now on the market are shortening-free cake mixes. All other ingredients are the same as in regular mixes except for emulsifiers, which must be added in increased amounts, varying with each type of cake.

Within the past 20 years, aerated products such as marshmallows, nougats, and frappes—which actually are low-calorie confections — have been

*Readers may be interested also in previous article, Big Strides in Dietetic Foods, FE, Dec. '55, p. 70.

made. They are low in calories because their bulk has been increased by aeration. The average 1⅛-oz. marshmallow bar, for example, has a little over 100 calories.

Comments on Confections

According to legal opinion, it is not possible to make low-calorie confections in which such materials as saccharin and Sucaryl are substituted for sugar. Furthermore, there is a legal clause which states that a nonnutritive substance (with exception of a few like confectionery glaze and pectin) cannot be used in candies.

This is unfortunate for several important reasons:

1. The prohibition was originally placed in the pure food laws to outlaw trinkets and toys that were used in confections, as it was believed children could be injured by consuming such products.
2. Other competitive branches of the food industry—such as dairy, baking, and soft drinks—can use saccharin and Sucaryl as well as many other nonnutritive substances.
3. Confectioners cannot ignore dietary needs of overweight consumers.

Solving the Problem

Solution can take on many angles. A confectioner can produce dietetic sweets by following strict labeling and adhering to analyses set forth for such products. These confections have such limited sales that most manufacturers shy away from making them because of high costs.

The logical solution to overweight involves more than incorporating bulking and nonnutritive sweetening ingredients in foods.

All new knowledge in nutritional chemistry has shown the need of a balanced diet containing carbohydrates, proteins, and fats. Each is essential, especially since the Atomic Energy Commission has found that the body actually continually rebuilds itself. Practically, a new body is formed every year instead of every seven years, as previously thought.

Dietetic Candy Formulas

Here are directions for making a high-protein, low-calorie frappe:

Cream 1¼ lb. of G-400 protein[4] with 15 lb. of Sorbo[5] (70% sorbitol solution). Add 4 qt. of water, let stand 2 hr., and run through a Whizolater machine to 6-oz.-per-gal. weight.

It is possible to make some hard confections with sorbitol and mannitol, where the latter is considered as having one-half the caloric value of ordinary carbohydrates. Powders like Irish moss, pectin, algins, and cellulose gums can be employed as fillers, along with artificial sweeteners like saccharin and Sucaryl. But these confections do not match the palatability of the regular ones.

Magic calorie figure that should be kept in mind by those wishing to lose weight is 1,200 per day. It is impossible for a normal person to gain any weight on this type of diet. And it is possible to produce foods, including confections, that will satisfy a person's nutritional needs so that he can maintain physiological functions while losing weight.

An examination of survival rations (worked out by the Quartermaster Corps) will indicate an approach to producing a low calorie confection containing all essential nutrients. A product of this type should be moulded, scored, and embossed with the number of calories furnished for a given square.

Such a ration can be prepared by cooking, to 241 deg. F.: Sugar, 29.33%; corn syrup solids, 4.00%; sorbitol, 8.83%; Wecobee,[7] 4.58%; chocolate liquor, 4.67%, water 34.49%. Added as 1% salt. Then batch is transferred to vertical beater and 13.1% nonfat milk solids whipped into it.

Diabetic Confections

Even for a special dietetic food for the diabetic, there is definitely a need for nutritional balance in the diet, and certain carbohydrates are necessary for the proper functioning of the body. Substituting saccharin and Sucaryl for sweetness is very important, but certain sugar alcohols like sorbitol and mannitol are essential, as well as other sugars found in natural fruits and berries.

Here are typical candy formulations that will be of interest to confectioners aiming at diabetics:

Low-calorie hard candies can be prepared by cooking ¼ lb. mannitol and ¾ lb. Sorbo to 310 F. Batch is then cooled to 250 F. and 4½% RA fat (100-F.-melting-point hardened coconut oil), with lecithin is added. Batch is further cooled in a water bath and mixed until it creams to consistency of dough. It is placed on a slab and worked until cool enough to cast or run on drop rollers.

Low-calorie hard candies also can be made by adding a small amount of water to 4 oz. of Sorbo, 4 oz. of mannitol, 4 oz. of dextrin. Batch is mixed, cooked to 267 F. and cast in starch.

Low-calorie marshmallows are made by cooking to 240 F.: Mannitol, 3 oz.; corn syrup, 4 oz.; 70% sorbitol, 3 oz.; and cane sugar, 2 oz. Batch is cooled to 145 F. in water bath. Added is a solution comprising 7g. of gelatin hydrated in 2 oz. of water. This type of marshmallow sets very fast, and it can be modified to work on cookies.

Dietetic lozenges are made by slowly adding ½ lb. of mannitol to 5 oz. of Sorbo, and creaming it to a granular state.

To make dietetic chocolate, melt (115 F.) 32 lb. Wecobee. Then add: Cocoa powder (low-fat), 8 lb.; nonfat milk solids, 16 lb.; proteins, 16 lb.; mannitol, 10 lb.; sorbitol, 10 lb.; Span 60,[6] 1 oz.; Tween 60,[6] 1 oz.; lecithin, 3 oz.; saccharin, 2 oz.; Sucaryl sodium, 12 oz.; vanilla, ½ oz.; and ethyl vanillin, ½ oz. Add emulsifiers (Span and Tween) last.

Editor's note: In developing above formulas, the author has employed products and equipment made by the firms listed here. Numbers refer to references in text.

1. Abbott Laboratories, North Chicago, Ill.
2. Seaplant Chemical Co., New Bedford, Mass.
3. Hercules Powder Co., Wilmington, Del.
4. Gunther Products, Galesburg, Ill.
5. Atlas Powder Co., Wilmington, Del.
6. Paul F. Beich Co., Bloomington, Ill.
7. Hard butter (mp. 114 F.) made by E. F. Drew & Co., Boonton, N. J.

I PREDICT . . .

. . . that laws will be passed stipulating that no dietary food can be marketed unless it has the nutritional quality suitable for the general public. In other words, strict diets that are fat-, protein-, or carbohydrate-free will have to be prescribed and taken under supervision of a physician.

Emphasis will then be on dietetic foods containing slowly assimilable sugars such as unrefined cane or beet, corn syrup solids, sorbitol, and mannitol.

These should be combined with vegetable proteins such as the new water-soluble gelatin and nonfat milk solids, which are retained longer in the digestive tract. Fats are slower to digest and give a feeling of well-being. They are essential to blood chemistry and maintenance of proper body functions.

A combination of these products with bulking agents—like Irish moss, pectin, algin, etc.—will produce one type of dietetic food.

The same carbohydrates, proteins, and fats, when aerated with vegetable proteins and emulsifying agents, result in a bulking product that gives an individual a more satisfying taste.—*Justin J. Alikonis*

SHRINK-FIT package for corned beef, an innovation with important benefits, is shipped in case with dividers for stacking strength.

CURING solution is pumped intravenously into bottom round cuts.

Form-Fit Corned Beef Pays Off Five Ways

New vacuumized, shrink-film package benefits packer in improved (1) marketing, (2) quality, (3) handling—(4) lower costs, (5) less loss

TRIMMED 3- to 5-lb. cuts are packaged, vacuumized, and sealed.

FE STAFF

In a clean break with traditional handling and marketing methods, Urban N. Patman, Inc., Los Angeles, now packages corned beef in Cryovac casings. And the brightly printed package has made this meat acceptable as a self-service and supermarket item.

But that is only part of the story.

Despite its popularity on menus, corned beef has been a relatively expensive, inconvenient, and sometimes undesirable product to handle and display. Being a wet product, it is prone to lose weight through leakage. This costly moisture loss necessitates special handling. The meat is perishable, spoiling rapidly unless soaked often in brine. Its preparation, storage, and shipment require stainless steel drums or barrels. And these must be stored in valuable refrigerated space.

In Cryovac casings, the red color of corned beef tends to brighten during the first few hours following packaging—and it remains bright. Packers and retailers don't have to add extra brine, or resoak for preservation. The no-leak package won't soil displays, customers' hands or clothing. There's no need for expensive trimming, reweighing, and rewrapping.

What's more, conventionally wrapped corned beef tends to turn grayish in color under normal case display lights. But Cryovac packaged meat, held at 30-40 deg. F., is salable for three weeks or more. It can be shipped in corrugated containers. Mold and slime hazard are reduced by the vacuumized, tightly fitting film.

There's kitchen-convenience, too. With a mild cure, the meat may be cooked in the package, retaining its juices and flavor.

Curing and Packaging

The Patman process (slightly different from Cryovac process) utilizes bottom rounds from selected beef hind quarters for raw material. These cuts are brine-pumped intravenously on scales. Then the product is placed in stainless drums, in a 38-deg. F. curing room, for 24-48 hr. Following curing, the meat is cut into 3- to 5-lb sizes. These are trimmed to make a neat, compact package.

For efficient packaging, the meat cuts then are placed in a loading chute. Next, a 6.5x18-in. Cryovac casing, with one end closed, is slipped over the end of the chute. And the meat is pushed into the casing.

To eliminate oxygen, and to draw the film closely around the meat, the package is then vacuumized. A vacuum nozzle is inserted between the loosely fitting film and meat to the bottom of the package. The open top of the tube is held closely around the nozzle while a vacuum of 6-8 in. is drawn. Then the package is slipped downward until the nozzle is free of the meat, and it is twirled to provide a tightly twisted vacuum seal. After removing the package from the nozzle, a clip is applied to the twist to form a permanent seal, and the surplus film is cut off.

To shrink the film tightly to the meat, packages now are placed in a stainless basket and dipped into 205-deg. F. water.

Capacity of each of the two ma-

(*Turn to page 189*)

40 TO 400 MESH OUTPUT UPPED AS MUCH AS 300%

ENGINEERING AIR SEPARATORS TO SPECIFICATION

. . . comes naturally to Sturtevant engineers. They have a tradition of success in developing dry-processing equipment and plants for more than 75 years — from the first rock emery mills to the most modern fluid jet micron-grinding equipment. If your problems include any of the processes listed in the coupon, it will pay you to investigate.

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Designed to cut costs! Sturtevant Air Separators are built for a lifetime of low-downtime service. Rugged construction plus easy accessibility for quick maintenance (typified by the "OPEN-DOOR" design in other Sturtevant equipment) assures more output per machine-year. Check the coupon for more information.

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For more data, circle this page number on card at back →

ANNOUNCING

The Opening of Competition for the

DODGE & OLCOTT, INC.

annual award for outstanding achievement in the Meat Packing Industry

to be presented during the 1956 meeting of the American Meat Institute

Award consists of $1000 and a gold medal, and competition is open to any member of the industry, either active or closely associated, who has made a definite contribution to the growth and general welfare of the meat packing industry as a whole.

Nominations may be made in all areas of RESEARCH, OPERATING or ENGINEERING, and there are no restrictions as to age, sex or nationality.

A copy of the rules and an entry blank will be mailed on request. Nominations close on August 1, 1956.

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"You surely have to be up early to beat the union to the best workers."

Ole Sage Episode

IS FOREMAN TRAINING REALLY JUSTIFIED?

—That's key question as Guff & Gripe members dig up initial 'when' and 'why' of instruction

IVAN C. MILLER
Associate Editor, "Food Engineering"

Even before dessert was served at the Guff & Gripe Luncheon Club, Batt Bulwark, works manager of Mull & Mull Co., burst out, "Let's get going on the foreman training."

He looked around to be sure all were listening, then reminded them: "At the last meeting, I claimed such training had gone too far. I stick by that. I don't think results—if any—pay for the costs." And he banged down his fist for emphasis.

Several around the table attempted to wedge in a word, but Batt was wound up: "I didn't get any training when I was a foreman, but I did my job well enough to move up to works manager. Now it's different. The pampered teacher's pets regularly go to classes, attend seminars, and even register for university courses. I'd like to know when this foreman training racket started and what possible reasons there were for it."

He went on: "It's up to threatening size—threatening because it's something like 'fringe.' It's becoming a costly trend, a ground swell that can swamp us."

"Batt, you're an alarmist," laughed Personnel Manager Milt Sorenson. "But you're certainly right about the trend. You must have been reading that AMA 1955 survey report showing that 88% of the responding companies give regular attention to *management* training and further that 61% of these programs include *foreman*.

Then Ed Strong, plant manager of Zenith Canning, broke in. "I think I've got a good answer to the 'why,'" he declared. "When Batt was a foreman—way back when—the country was still working gangs of unschooled immigrants. But it's different now when everyone has some education. Believe me, workers today are smart. And foremen have to be a lot smarter."

Several of the others nodded in agreement as Ed looked to Ole, for confirmation of his view.

Old-Timer Sage, retired but still active as a personnel relations consultant, did agree. "Yes, Ed," he said, "you're right. But yours isn't the only reason."

He paused to drain his cup of coffee before the waiter could snatch it away. Then he went on: "To run down Batt's question and understand when and why, let's go back a bit. Before the depression, the foreman was management. He was THE Boss. He hired and fired according to *his* judgment—or lack of it. In some companies foremen even acted as paymasters—paid workers in cash and, on occasion, demanded kickbacks."

Batt bristled and half rose. But before he could interrupt, Ole held up his hand and consoled: "That wasn't pointed at you, Batt—for if you'd been like that, you wouldn't have climbed to where you are today."

"But Ole—you paint 'em too black," Batt remonstrated. "All foremen weren't like that."

"You're right," came back Ole. "I was a foreman myself about that same time, and I know that not all were sinners. And not all were disliked. Unfortunately, however, there were enough of that type to build a lot of distrust.

"In those years just before '29, business 'knew the answers' and was 'infallible.' But the depression ended that. The collapse weakened confidence in management and strengthened dependance on government."

Ole tamped down the tobacco in his pipe, then explained further: "Government, very soon after, was bolstering labor and the unions. And so the foreman—no longer THE Boss—was stripped of power and required to defer many of his decisions to another 'authority,' the union.

"Thereafter, as union strength grew, we found that managements—far too many of them—were conceding that only specialists could handle the many new problems between management and labor. So a lot of plants brought in such specialists, not merely to advise but to direct the whole job of industrial and personnel relations.

"All of you who worked in this period know that the position of the foreman got much weaker and that he became confused and frustrated."

Sorenson reached over with his lighter, and Ole puffed his pipe to life, then plunged on:

"Next, when World War II sparked industry's huge all-

out program, a small army of foremen and supervisors was needed almost overnight to 'oversee' the hordes of new employees. And then the procedures and methods constantly changed. Old as well as new employees required instruction. Fortunately for this country, this training demand was met—in large part by Training Within Industry, the program originated in the Council of National Defense in 1940. Job methods, job instruction, and job relations were covered.

"Here, management—top brass—was 'trained' to understand what training really is and what it can do for the plant. Next, line executives and supervisors were instructed in the use of supervisory problem-solving methods. Finally, staffmen with functional responsibility for planning and training were schooled in the use of a method for solving production problems through training.

"More than 1,300 food plants were included. And TWI instructed upwards of 59,000 individuals in these factories, mostly foremen and supervisors who, in turn, passed on the training to approximately 700,000 employees.

"Now, you remember that Ed Strong pointed out the need to train foremen to measure up on education. Anyway, this TWI effort convinced many managements that such training paid handsome dividends in a forced-draft emergency period."

At this point, Si Worth, personnel manager of Zenith, offered his view: "From the standpoint of one responsible for personnel relations, there's a very special reason foreman training is vital. Any worker who seeks advancement in the union—and plenty do—must devote long hours to union courses and study. And as stewards, many of them become well informed and learn to think on their feet.

"And so it seems to me that unless foremen are equally trained—at least on points of labor relations, contract negotiations, grievance handling, and the like—they will be at a great disadvantage in the common contacts and hassles with the stewards or other labor representatives."

Then Tom Watson, p.m. of Y & G Specialty Foods, chimed in to say his outfit got most formen directly from the ranks. "And," he added, "you have to be up early in the morning to beat the union to the best of the workers!

"Even at that," he went on, "chances are that most new foremen hold a strong worker view and are pretty thoroughly union indoctrinated. Anyhow, I'll go along with the idea that an understanding of the worker's viewpoint is an asset to anyone in management. But to be efficient, a foreman must look through management's eyes —as well as through those of the worker.

"It seems to me," he concluded, "that you've got to train new foremen in order to get them to understand management and realize their part in it. What's more, I'm convinced you can't ever afford to stop that kind of training."

"There's still another angle," contributed Sorenson: "The development of management from within the organization—as far as possible—is now considered best. That's because of its good effect on employee morale, and procurement, and turnover.

"Foreman training not only reveals those who can best qualify but continually prepares them for advancement. So I, too, say foreman training is a must."

"Sorry, fellows," broke in Si Worth, "but I've got to get back to my job—before Zenith sends out a foreman after me," and he ground out his cigar and rose.

As others followed suit, Batt interjected: "We've certainly not finished with this subject. And we won't be until some one fills in with down-to-earth facts on just how much this foreman training costs, and just how much solid dollars-and-cents value *results*."

"Okay, boys, that'll be it for our next meeting," called Ed Strong.

Readers are invited to contribute their comments on any points raised in our Ole Sage Episodes. Just address Editor, "Food Engineering," McGraw-Hill Pub. Co., 330 W. 42nd St., New York City 36.

From Ole's Notebook

Milestones of Progress in Industrial Relations

"The increased adoption of unemployment compensation and job and wage guarantees are milestones in a long-evident trend.

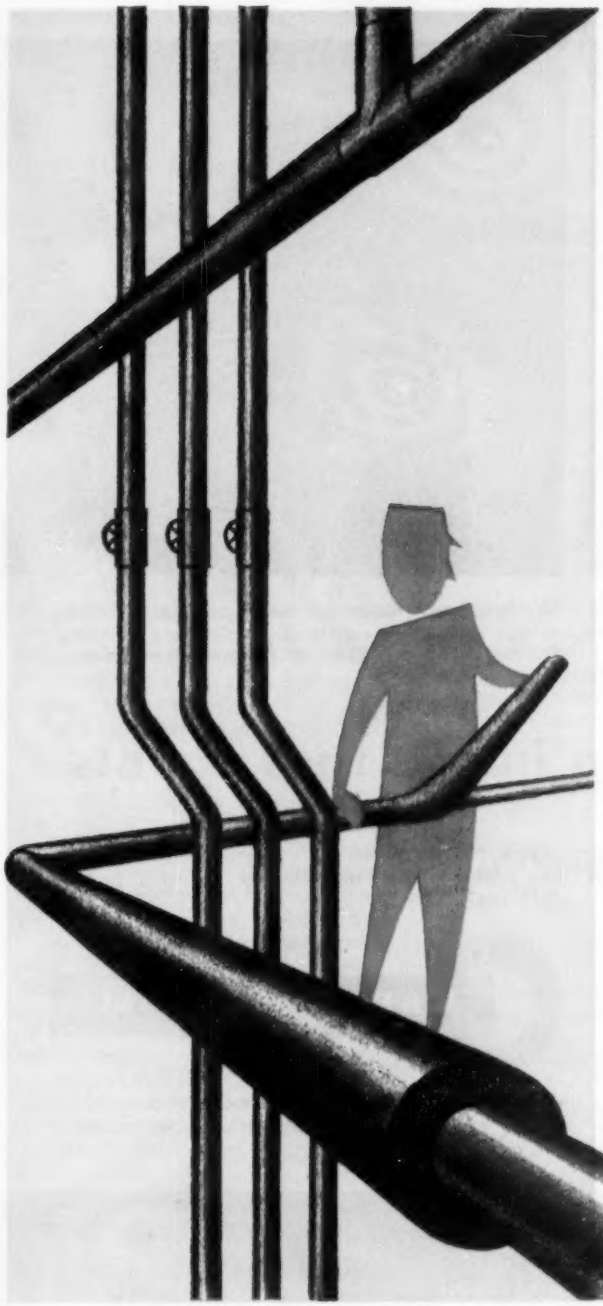
"In the past 10 years at least, many of the differences benefit-wise between the man in the plant and the man at the desk have been eliminated. Today the hourly worker has paid holidays, paid vacations, pension plans, life and accident insurance, and other benefits that were largely limited to salaried employees as recently as 1946. Workers in general seem to be on the way to even more stable work status.

"They may seldom work overtime" (so timeclock may be "out").

"Within our lifetime, the manufacturing employee may be elevated to a straight salary that is paid the year round. Then he will seldom work overtime, nor will he be subject to layoffs. But in return, he and his union will have to shoulder greater responsibilities. Absenteeism must be decreased, productivity increased, and work stoppages prevented.

"For the gains to come, labor must surrender many of its past privileges. Among the concessions it will have to make for greater job security will be an increase in mobility. The traditional concept of rigid or departmentalized seniority is in for some rapid changes. Unions will have to recognize the company's right to transfer employees freely from one job to another—even

(*Turn to page 101*)



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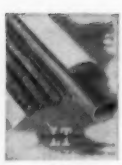

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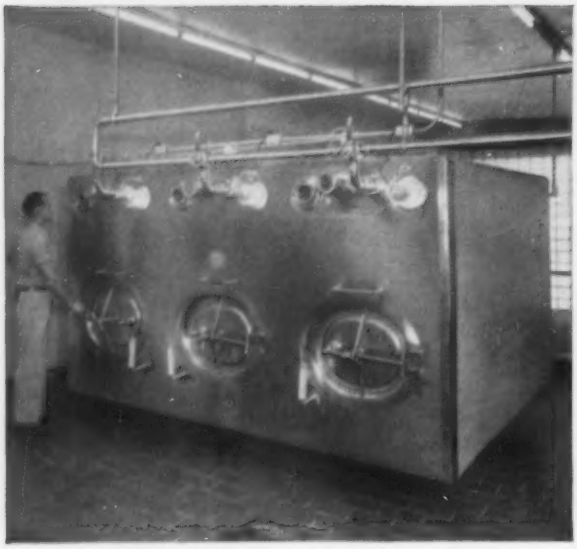
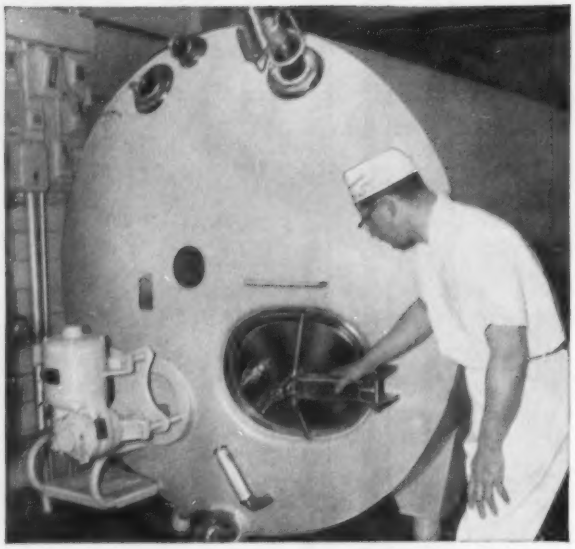


Cherry-Burrell 3-compartment Rectangular Tanks ... Insulated for holding, heating, cooling. Standard capacities individual tanks to 5,000 gal. Special sizes upon request.



Cherry-Burrell Horizontal Tanks. Insulated for holding or with channel wall surface for pre-heating, pre-cooling. Standard capacities to 10,000 gal. Larger sizes available.

It's what's going on inside that counts

And what goes on inside Cherry-Burrell Stainless Steel Tanks varies as much as the size and shape of the tanks shown here.

For example, you can use them as process vessels for handling a wide variety of liquids and semi-liquids ... to provide "surge" for heating and cooling in continuous systems ... for blending and pre-heating ... formulating and holding ... for mixing, heating and cooling.

No matter what size or shape tank you need ... or *what service you want it for* ... you can get it from Cherry-Burrell. And you can get more specific information from your Cherry-Burrell Representative. Why not lay your tank problems in *his* lap?

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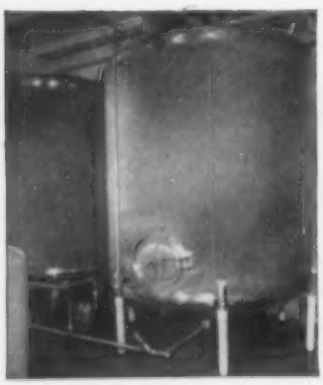
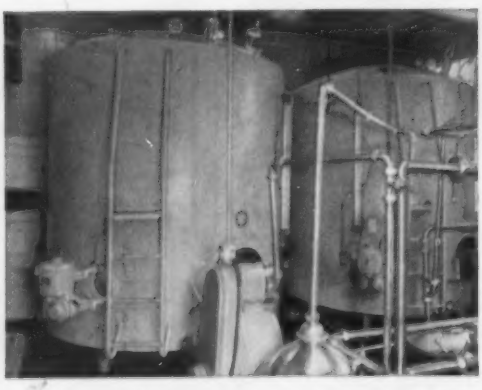
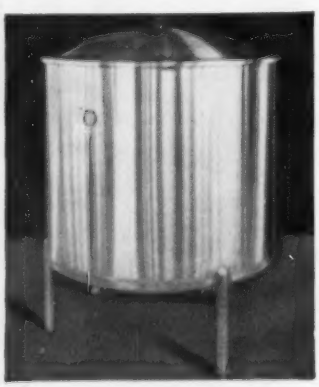


Cherry-Burrell Single-Shell tanks for holding, mixing, blending of one or more products. With or without agitation. Capacities to 3,500 gal. Larger sizes available.



Cherry-Burrell Vertical Tanks for pre-heating, pre-cooling, holding product temperatures. Standard capacities to 3,000 gal. Larger sizes available.



Cherry-Burrell Open Top Single Shell Tanks for "surge" storage, batch mixing operations; side or bottom mixing. Standard capacities from 60 to 500 gal. Larger sizes available.

Ole Sage Notebook

—Continued from page 98

from one plant and one locality to another on certain occasions.

"Such practices as featherbedding and slowdowns due to frivolous grievances must be eliminated. Discipline will have to be tightened up, with local labor leaders accepting their full share of responsibility in their process. Soldiering on the job, malingering, chronic absenteeism or tardiness are expenses that will not be tolerated. Plant rules must be rigidly enforced." —*Robert C. Hendon, at AMA's Personnel Conference.*

Important Pointers For GAW Bargaining

"Important to all who will eventually face bargaining on GAW or supplementary unemployment benefits are the certain basic and essential criteria developed by Ford in advance of negotiations. Here they are:

"1. A definitely limited, predictable liability.

"2. Insurance that liabilities would never exceed the funds currently available.

"3. Protection against the possibility that older seniority employees might find themselves laid off after available funds had been exhausted by payments to lesser service employees.

"4. No deviation from the acceptable employment insurance principles that the laid-off employee has primary responsibility for earning his living by seeking and accepting available employment elsewhere.

"5. Integration with state unemployment compensation system, with company benefits to go down when those of state go up.

"6. Recognition of the necessity of providing a financial incentive to laid-off employees to find other work and of the necessity of avoiding serious inequities between employees who remain at work and those drawing unemployment benefits.

"7. Provisions against the continuation of contributions beyond sound funding needs of the plan to avoid excessive accumulation of money that might invite pressure of unsound benefit liberalizations.

"8. No second-guessing of state agencies as to standards in such matters as disqualifications, availability of work, and suitability of job offers.

"9. Exclusion of layoff due to concerted employee action and simplicity and economy of administrations."—*Malcolm L. Denise, General Industrial Relations Manager, Ford Motor Co., at AMA Personnel Conference.*

Make the Job Fun

The trouble with many employee-welfare projects is that they try to give people satisfaction outside of their work life, whereas the real problem is to give them greater satisfaction—more fun—in their work—*"Management Briefs," Rogers, Slade & Hill, New York City.*

Strategic Question-Boards Nail Down Rumors

Gossip and rumors in plants range from the serious to the silly and fantastic. In any event, they accomplish no good, often cause harm.

Common example of a serious rumor: "There's going to be a layoff, I hear. Wonder if it will affect me."

And here's a silly and fantastic one: "They are going to make plant roofs of special glass to put more sun vitamins in our products. We may get sunstroke."

At least one company has made an effort to 'scotch' all rumors, regardless of kind, by truthfully answering everyone at the start. Management posted "rumor boards" at key plant locations, with this legend—

RUMORS FLYING?
Get the Right Answers Here

Attached was a pencil and a pad of paper with the instructions, "Write down in the space below the question or rumor you want answered."

A few days afterward, rumors really began to fly—onto the rumor boards. One employee asked, "Is it true that a labor union has filed notice with the company of its intentions of attempting to organize here?"

Another queried, "Is it a fact that there is going to be an extended vacation period this year due to layoffs?"

Neither of these rumors was true, though both were of the type that the company wanted to nail down.

And many queries posted weren't strictly rumors. Some were complaints, some were criticisms. Seldom were the boards empty.

■ **One gratifying development was that trivial or nonsensical questions and gripes seemed to irritate or embarrass the general personnel.**

Often, employees themselves reprimanded such questioners with comments on the board. Or sometimes a mention was made to members of the Personnel Department expressing the viewpoint that such a question deserved no answer.

The boards are checked periodically by members of the Personnel Department—who then contact the proper persons in the company to tackle the questions. Answers are then typed and posted on the boards.

Questions are usually answered the same day as they are entered.—*The Management Review, American Management Assn., New York City.*

Letters to the Editor

About Plant Workers With Uncovered Heads

Dear Sir:

In FOOD ENGINEERING some photographic reproductions show workers with uncovered heads.

The possibilities of food contamination arising from falling strands of female hair, human dandruff, or bobby pins, is not imaginary—it happens, and the thought is not aesthetic.

Female workers have always been more or less reluctant to cover their heads properly when at work, lest the covering detract from personal appearance. Male workers are indifferent—they have less hair to cover.

Few thoughtful people will quarrel with the necessity for proper head covering when workers are employed in food plants. What is really wanted is management's insistence that all employees' heads be completely covered with functionally designed caps. These should be served out and changed with the same frequency as the rest of uniforms.

In the case of female workers, caps should be attractive when worn (to cut down on workers' resistance to wearing them). The same for the male workers—they like to look nice too.

With the application of such psychology to the problem, that loophole in personnel hygiene would be closed. —Alfred E. Leighton, Consulting Food Technologist and Chemist, Riverdale, N. Y.

COMMENT—No food plant can be too careful about product protection. And covering long hair has a safety advantage, too. It removes any hazard that the tresses will become entangled in the machinery.—The Editor.

In Behalf of Progress . . .

Quality Program Sets Pattern for Industry

There is a progress pattern for other branches of the food industry in a quality-control program developed by Dairy Products Improvement Institute. And there are pointers on how manufacturers can regulate their own business—with less dependence upon city, state, and federal officials.

DPII on February 16 announced a set of requirements for the sanitary production of sweet cream and milk for manufacturing. These requirements, presented in two booklets, constitute a comprehensive practical program for milk producers and processors.

Several years in development, this program is so well-considered that it draws praise from an official in the strict New York State Department of Health.

The requirements are high enough to upgrade the quality of manufactured dairy products in general, which should boost consumption.

Surpluses then will be reduced. Farmers, dairy manufacturers, and taxpayers will benefit. And consumers will have a still better diet.

By setting up acceptable standards—plus industry enforcement procedures—the program should free the movement of raw material to processing plants in distant markets. Too long have health regulations impeded interstate flow of raw milk for manufacturing.

The program will tend to eliminate multiple inspections of dairy farms, an expensive practice. Equally important, it will plug existing control gaps. Some regulatory officials have not supervised supplies of milk for manufacturing.

The power of advertising notwithstanding, consumers must be induced by taste appeal to want more ice cream, butter, and milk powder. And this quality must be consistently high. One reason margarine gained such popularity is the dependable absence of off-flavor and contamination.

Dairy manufacturers should get behind this program and make it work. It will require conscientious application, plus patient farmer education. But the dividends will justify the effort.

Other branches of food manufacturing should watch this program. It will mean increased competition for some. It may point to the solution of a raw materials problem for others. And it's a sample of the kind of self-regulation by industry that shakes off the shackles of officialdom.

Needs Some Explaining

Favorite scapegoats for politicians playing to the farm vote, food manufacturers and processors are blamed for the increased spread between farm and retail prices.

This points up an educational job that food companies have to do. And one that becomes more necessary with each advance in convenience food products.

Sure the spread has increased. But as Swift has pointed out, the cost of sliced bacon is greater than that of slab bacon. And the difference is even more pronounced between the cost of preparing and selling fresh beef and preparing and selling a frozen beef pie.

But more convenience—more value added by manufacture—is what most consumers want. So food manufacturers must put still more price spread into products.

Higher plant labor costs, up 7¢ an hour in the past year, added to the spread. Other expense items are up, too.

Last year, farmers received $82 less for the food in the annual family market basket, than in 1952. Consumers paid only $55 less. So the price spread increased $27.

This doesn't represent higher profit to middlemen.

And the spread would have been much greater if our industry hadn't stepped up efficiency to help offset rising costs.

Support Career Brochure

Congratulations to the Institute of Food Technologist for publishing a career brochure to "sell" the food industry.

Entitled, "Food Technology. . . Its Challenges and Rewards as a Professional Career," the booklet is in the style of a promotion piece, yet with information that gives teachers and high school students, an idea of what our industry offers.

By now, 64,000 copies will have been mailed. A good start, but a drop in the bucket. If one out of 1,000 copies brings a youngster into the industry, the batting average will not be bad.

So it is desirable that several hundred thousand copies be sent out in the next year. To do this will cost good money.

The first five letters sent out by IFT to request funds to help with this job brought $1,000, and promises for another $750. Nice going! And we hope many more food companies will come through.

There's a big recruiting job to be done. And the food industry must do it against competition from well-heeled organizations promoting technical careers in other fields.

In many plants, Celite diatomite filtration has helped process control men maintain the desired balance between clarity and flow rate.

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For maximum clarity, Celite* offers a filter cake hundreds of times finer than the finest wire mesh. *For maximum flow rate,* Celite offers more than 2,500,000 filter channels in every square inch of the filter cake's surface. Thus, you can maintain highest quality without handicapping your production schedule . . . expand production without creating a clarification bottleneck.

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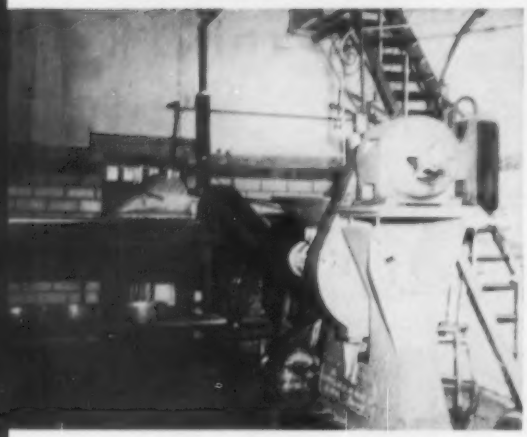
Celite is in wide use today filtering sugar, beer, jellies, syrups, cooking fats and oils. If your product is in a liquid state at some stage of processing, perhaps Celite can help you solve the quality versus production problem. A Celite engineer can give you the answer fast.

To get in touch with a Celite engineer or obtain further information on Celite diatomite filtration, write Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ont.

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products.

Johns-Manville CELITE FILTER AIDS



1 **BEEF** trimmings are ground in unit (right), then conveyed by inclined screw (rear) to steam-jacketed braiser (left).

2 **DOUBLE-VALVE FILLER** deposits measured quantity of products in hot-water washed casseroles (two at a time). Capacity of filler, 55 per min. Tins are conveyed (foreground) to check-weigher.

Making "Heat-And-Eat" Foods

Advanced equipment and processing techniques—some company-developed—are employed in the carefully coordinated lines for preparing specialties

EMPLOYING highly engineered facilities in a multi-product operation, Otoe Food Products Co., Nebraska City, Neb., has greatly expanded its lines for production of Morton House foods.

This growth was sparked by principles set up by foresighted management, plus the swelling demand for the company's "heat-and-serve" products.

Each of these products is prepared on a separate line, with three of these—canned casserole products, pot pies, and meat-sauce type sandwich fillings—depicted in the accompanying foldout flowsheet.

Preparing Dinners, Pot Pies

Casserole items include potatoes au gratin and ham, sliced beef with vegetables and gravy, tuna en casserole, and meat and spaghetti with bacon garnish. These are packed in hermetically-sealed, lithographed tins made in the company's own can plant.

In their preparation, diced meat and vegetables, sauce, and gravy are cooked in steam jacketed kettles. Spaghetti is blanched in boiling water in similar cookers.

For spaghetti and meat, beef trimmings are ground and braised in a company-designed unit—Point 1. Filling is by a piston-type, volumetric unit (2) that deposits products in the previously washed casserole tins (two at a time).

Tins are then check-weighed, garnished with slices of bacon and vacuum-sealed. They are processed in retorts, cooled and packed in shipping cases. Capacity of the line is 60 cans per min.

Filling for the pot pies comprises vegetables, meat or fish, and gravy. It is prepared in jacketed cooking kettles and metered into pie-shaped cans as they are conveyed (four to a holder) on the master line.

Meanwhile, pastry dough is cut to size by a divider and conveyed to the top-crust roller where it is formed in sheets. Dough is then placed on the filling in the tins (3).

Crust is trimmed and crimped, then cans are vacuum-sealed, loaded in metal crates, and go to pressure retorts for sterilization. Speed of this line is 80 per min.

Sandwich Filling Line

Packed in No. 2 cans on the third line are sandwich-type fillings. These include chipped pork and barbecue sauce, beef slices and barbecue sauce, chopped beef sandwich filling and barbecue sauce, boned chicken sandwich filling, and chopped ham and gravy.

Meats are cut in slices by modified bacon-slicing machine (4), loaded in perforated stainless baskets, and cooked by live steam in 200-gal. stainless kettles, (5).

Following cooking, meat and sauce are charged into a horizontal-type sausage mixer (6), then transferred to a 20-pocket hand-packed filler for canning. Cans are seamed, heat-processed, labeled and cased.

Speed of the line is 30 per min.

For complete details of a food company's remarkable growth in manufacture of products designed for consumer convenience, see "Specializing in Specialties" p. 50.

The advanced methods applied to making of Otoe's other Morton House products will be the subject of next-month's foldout flowsheet.

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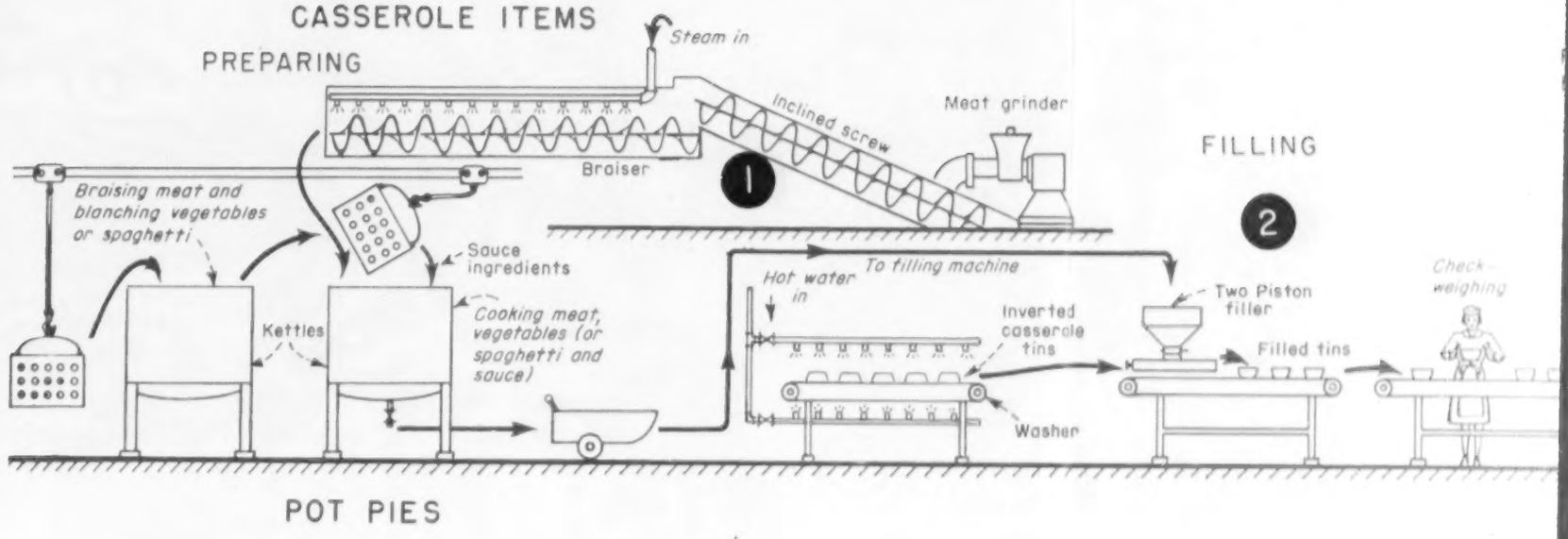
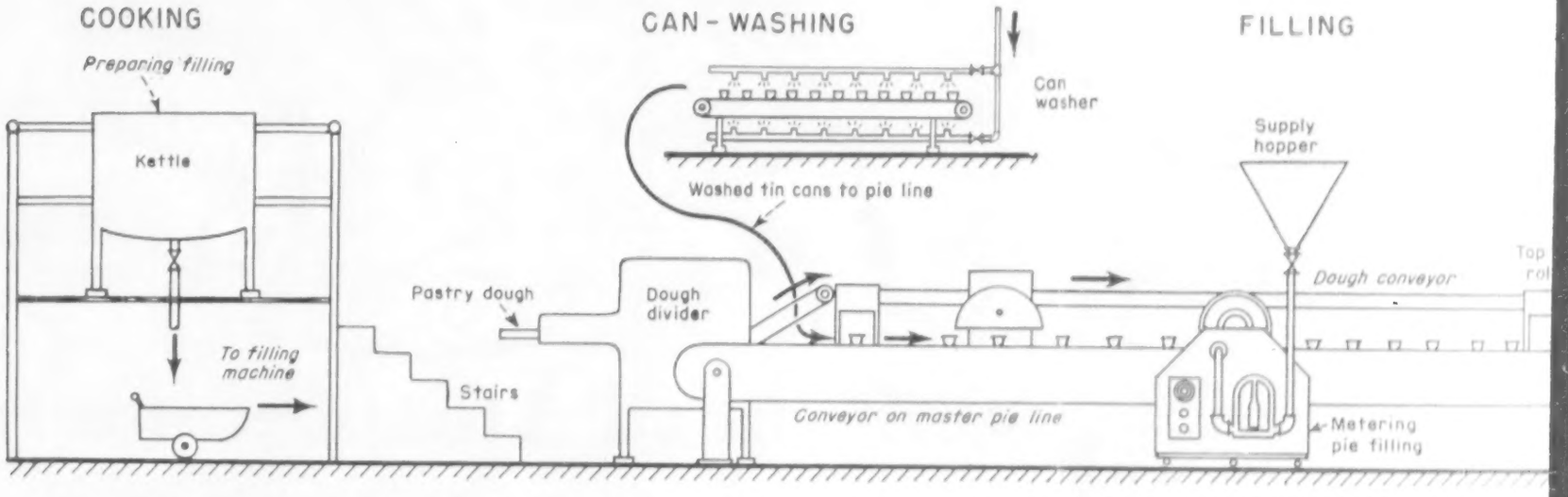
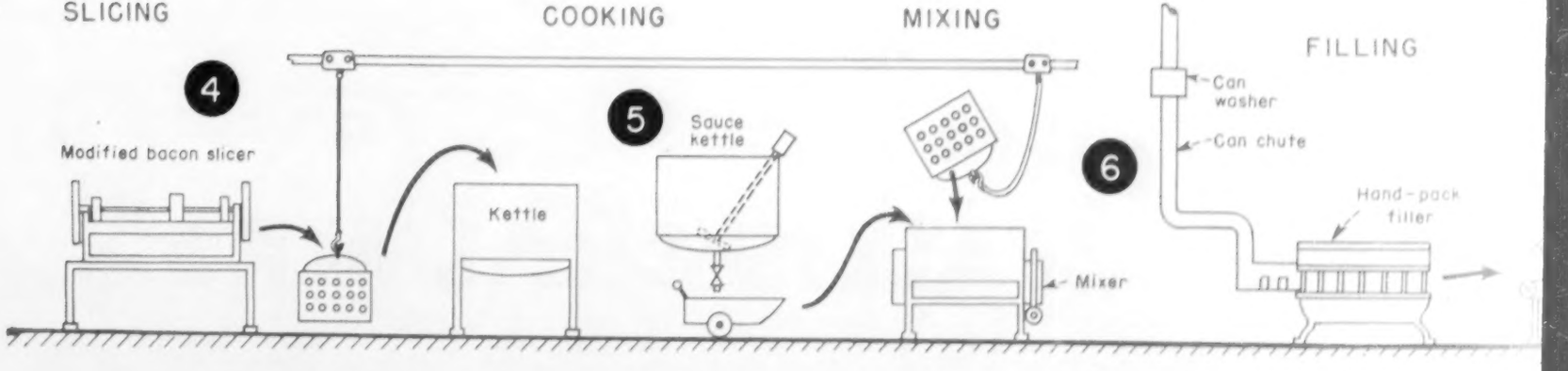
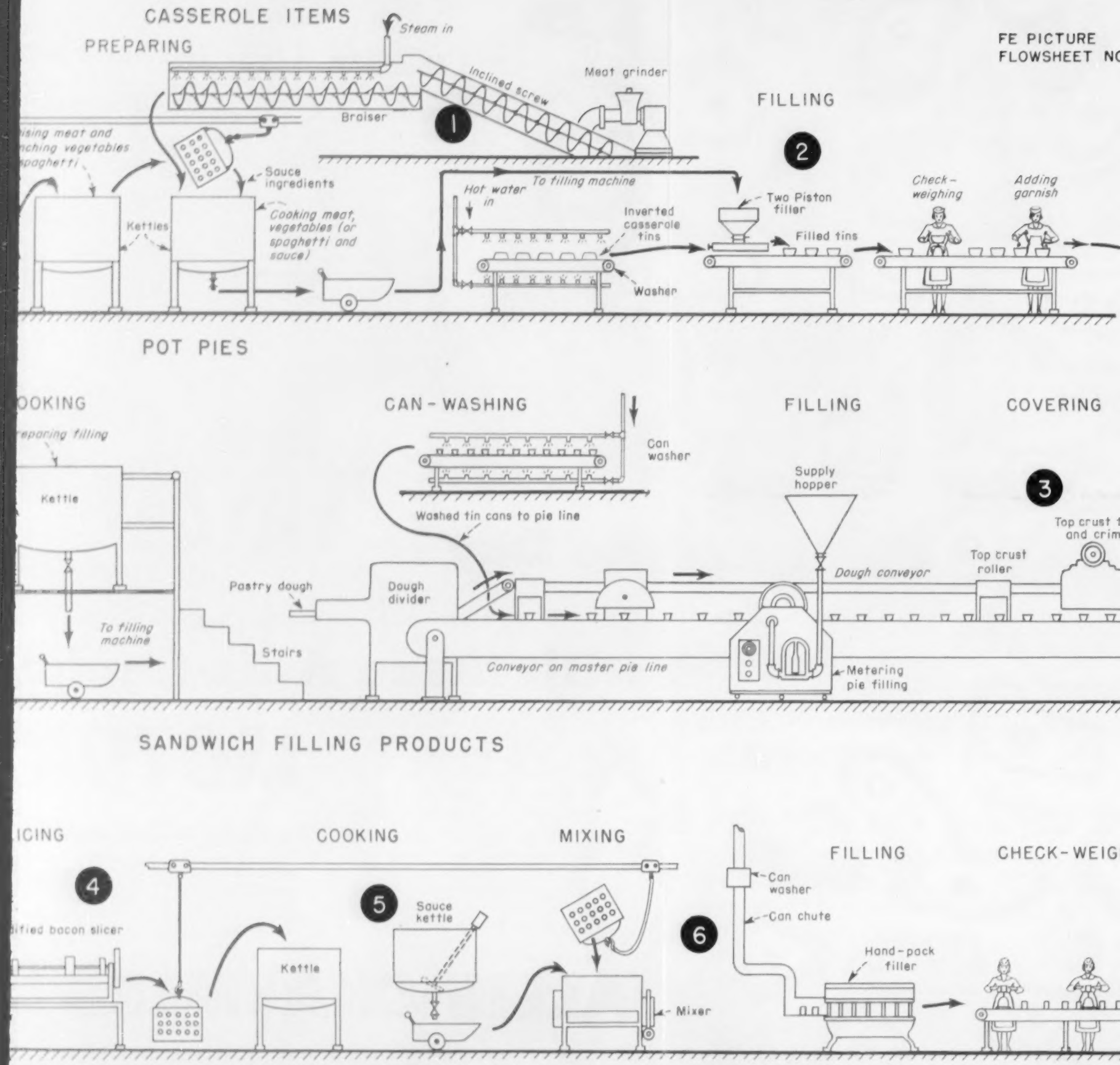


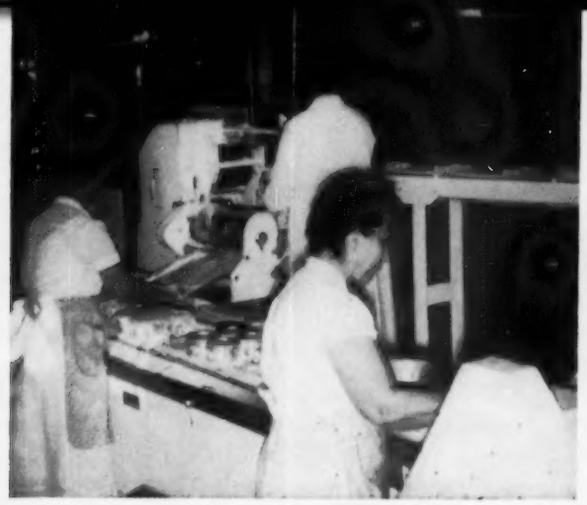
POT PIES



SANDWICH FILLING PRODUCTS




CASSEROLE ITEMS
PREPARING
Steam in
Meat grinder
Inclined screw
Braiser
1
FILLING
2
Sauce ingredients
Kettles
Cooking meat, vegetables (or spaghetti and sauce)
Hot water in
To filling machine
Inverted casserole tins
Two Piston filler
Filled tins
Check-weighing
Adding garnish
Washer
POT PIES
COOKING
CAN-WASHING
FILLING
COVERING
Kettle
To filling machine
Can washer
Washed tin cans to pie line
Supply hopper
3
Pastry dough
Dough divider
Dough conveyor
Top crust roller
Stairs
Conveyor on master pie line
Metering pie filling
SANDWICH FILLING PRODUCTS
ICING
COOKING
MIXING
FILLING
CHECK-WEIG
4
5
6
Sauce kettle
Kettle
Can washer
Can chute
Hand-pack filler
Mixer

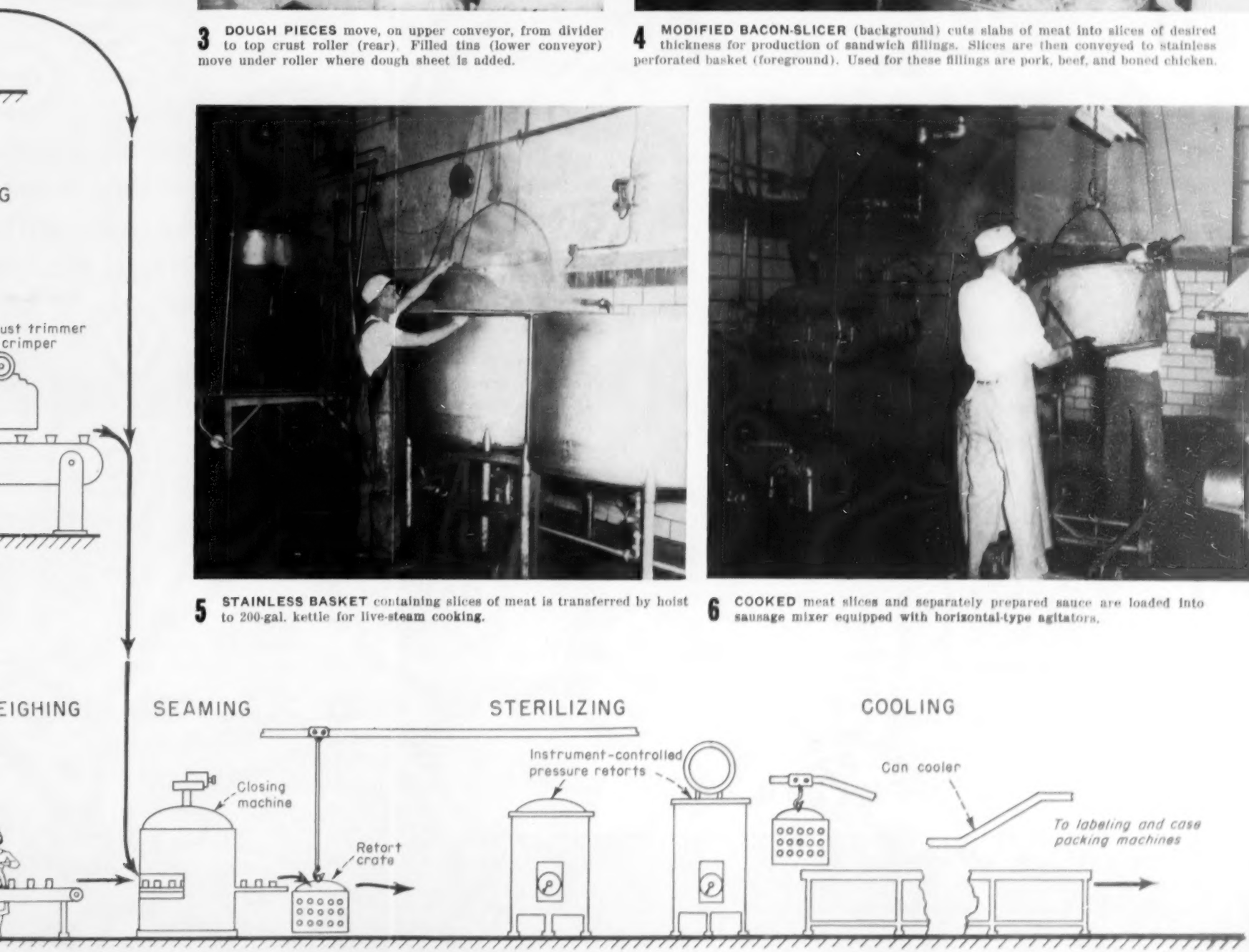


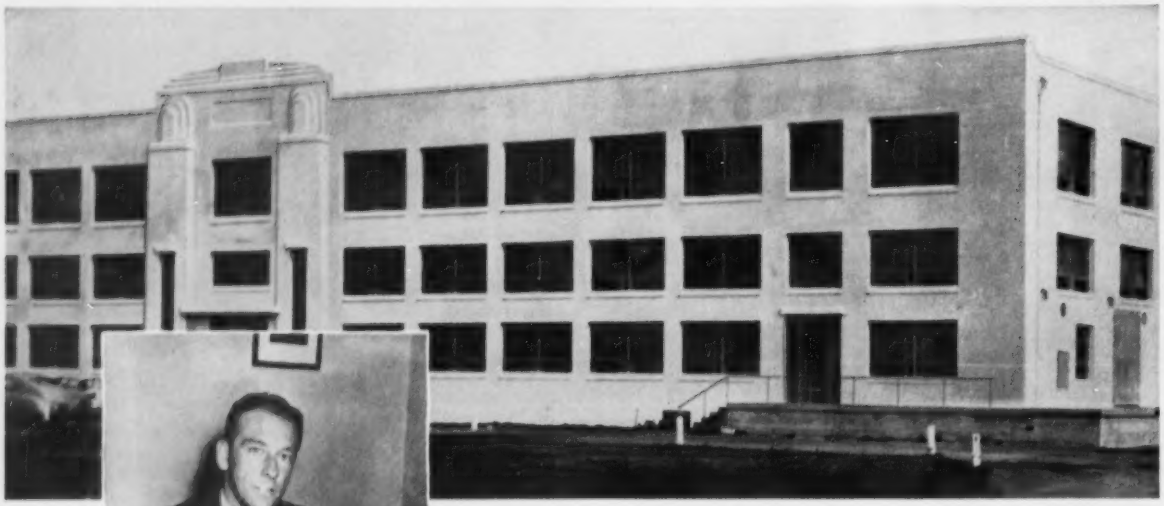
3 **DOUGH PIECES** move, on upper conveyor, from divider to top crust roller (rear). Filled tins (lower conveyor) move under roller where dough sheet is added.

4 **MODIFIED BACON-SLICER** (background) cuts slabs of meat into slices of desired thickness for production of sandwich fillings. Slices are then conveyed to stainless perforated basket (foreground). Used for these fillings are pork, beef, and boned chicken.

5 **STAINLESS BASKET** containing slices of meat is transferred by hoist to 200-gal. kettle for live-steam cooking.

6 **COOKED** meat slices and separately prepared sauce are loaded into sausage mixer equipped with horizontal-type agitators.

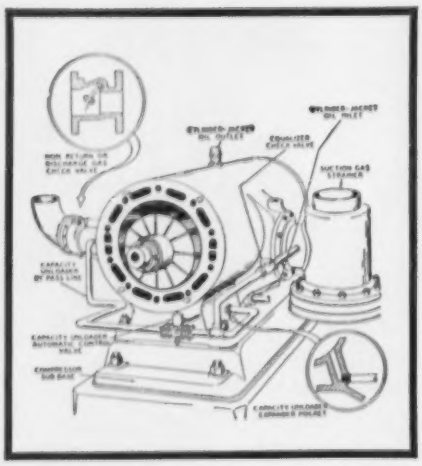




PARTIAL VIEW OF THE PHILLIPS PACKING COMPANY BUILDING

...C. RICHARD DRESCHER
PHILLIPS PACKING COMPANY, INC.
CAMBRIDGE, MD.

"FES-FULLER ROTARY BOOSTER is the one for us"



Many different types and makes of equipment were carefully examined by engineers and purchasing men to arrive at the best possible solution to the problem which confronted Phillips. After weighing all of the advantages and disadvantages, a decision was made..."FES-FULLER ROTARY BOOSTER IS THE ONE FOR US."

Maximum efficiency, low maintenance cost, ability to match a variable refrigeration load, and complete reliability of the FES-FULLER BOOSTER made the big difference.

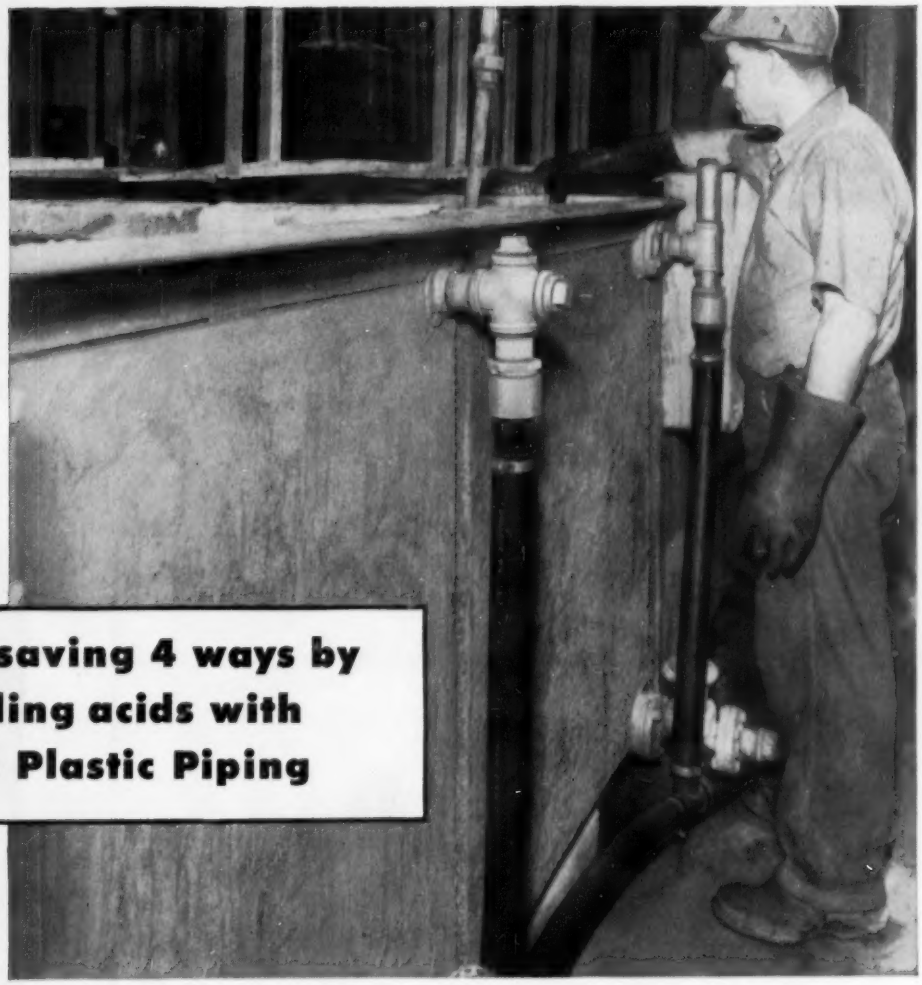
This is just one more example of why FES-FULLER ROTARY continues to be the most popular booster compressor for refrigeration.

Write or contact FREEZING EQUIPMENT SALES, INC., for the solution of your freezing problems.

FES FULLER

5979

FREEZING EQUIPMENT SALES, INC., 423 WEST MARKET ST., YORK, PENNA.
Qualified distributors in principal cities
LOW TEMPERATURE FREEZING EQUIPMENT



They're saving 4 ways by handling acids with Crane Plastic Piping

THE CASE HISTORY—Globe-Union Inc., leading storage battery builder, in its Milwaukee plant, might have decided plastic piping wasn't for them and let it go at that. Instead, they gave Crane plastic products a fair trial, and here are the results.

On hydrochloric acid lines to zinc-plating tanks, the metal pipe and fittings formerly used had to be replaced completely about every month. Corrosion was the cause.

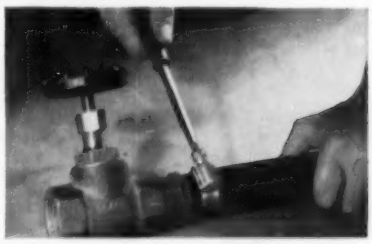
With Crane polyethylene pipe and Crane plastic fittings in this same service, after more than 3 months there is no sign of deterioration and no apparent need of early replacement.

On battery test tanks, Crane plastic piping, exposed to built-up sulphuric acid concentration, looks good as new after more than 4 months' service.

Savings with Crane plastic piping are adding up 4 ways. Plastic cancels the need for costlier metal pipe. It is installed in a fraction of the time it takes for metal pipe and fittings. It reduces installation to a one-man job with simple hand tools. The longer life of plastic is saving replacement, maintenance and housekeeping costs.

Proved in severest services, Crane plastic piping is giving Globe-Union equal satisfaction on many low-pressure air and water lines. Here freedom from sweating is another advantage of plastic.

Once you know the facts of quality-designed, quality-made Crane polyethylene pipe and Crane plastic insert fittings, you, too, will see many opportunities for saving with this modern piping. Call your local Crane Representative today, or write to address below.



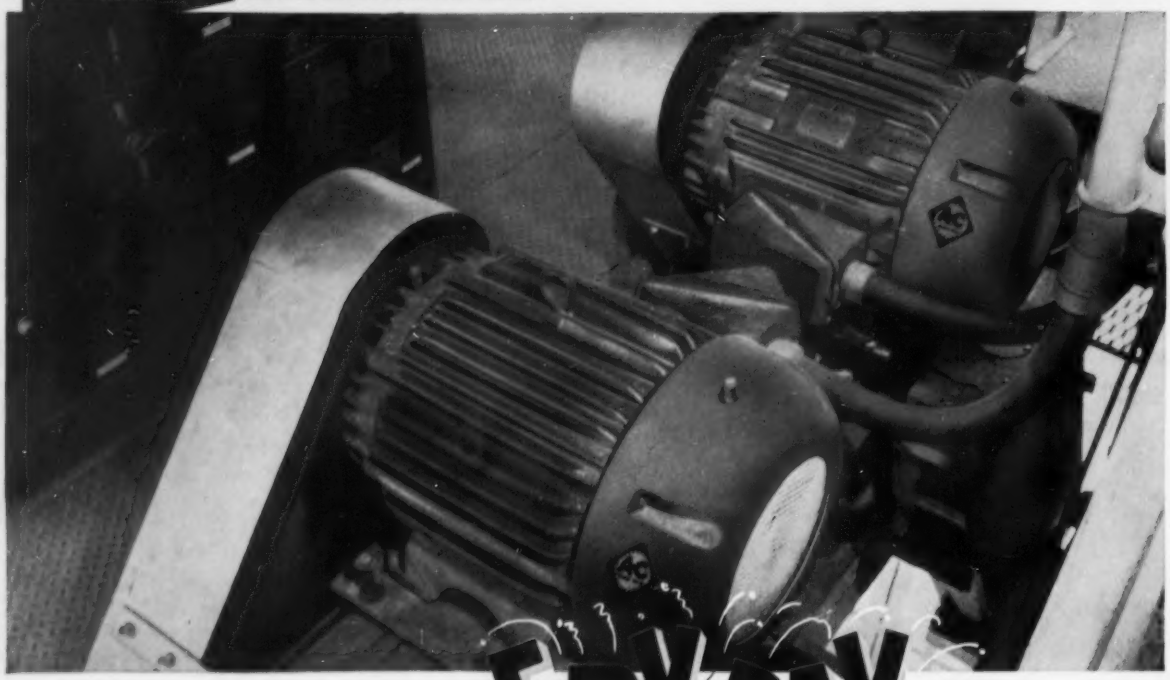
Crane adapter makes plastic-to-metal joints easy

CRANE PLASTIC PIPING

VALVES • FITTINGS • PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

There's **MORE** Cooling Surface in these deep-ribbed **MOTORS**



No Day is FRYDAY

with these Allis-Chalmers MOTORS

● Frying of insulation is impossible under normal conditions with the extra-large cooling surface of Allis-Chalmers rib-type TEFC motors. The result—you expect and get longer motor life.

The engineered partner of A-C motors is Allis-Chalmers control.

Get Complete Information

As a new machinery component or as replacement, specify Allis-Chalmers. Discuss your particular application with your nearby A-C distributor, A-C district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

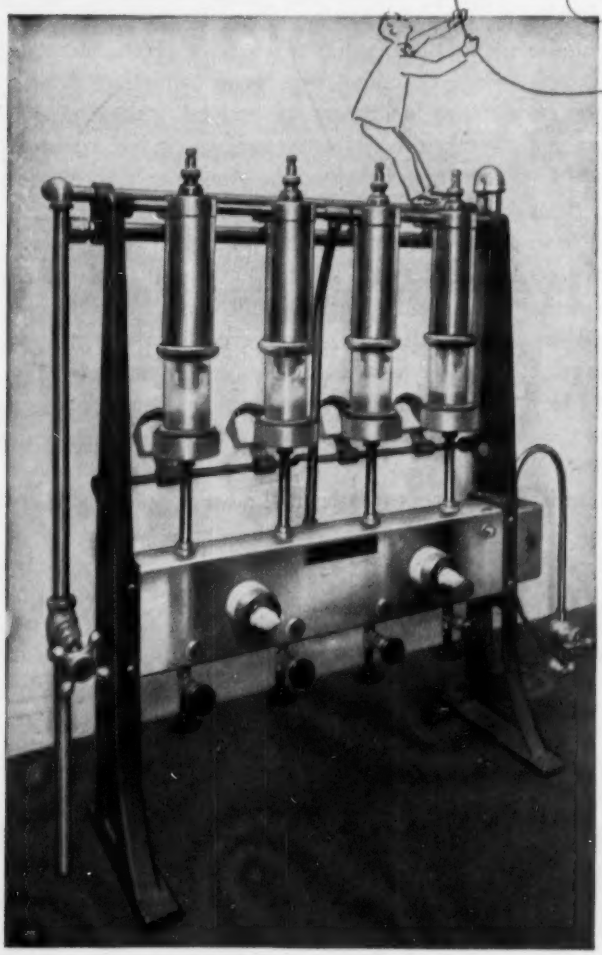
ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-4940

How Griffith's Extraction Process* Assures Better-Flavored Products

®PEPPEROYAL AND SOLUBLIZED SEASONINGS



True Flavors in Smooth Mellow Blend —The Taste of Sunshine All the Time

In this age of scientific miracles, Griffith's staff of chemists enables you to change a good product into a delicacy—simply by changing to PEPPEROYAL or SOLUBLIZED SEASONINGS.

Griffith's Solublized Seasoning Formulas set a new high standard in flavor potency, purity and uniformity. By a special extraction process,* Griffith controls flavor quality. Blend spice extractives scientifically—with predictable, dependable results for spice users!

Change from the old to the new sunny-day flavor quality—change to PEPPEROYAL or SOLUBLIZED SEASONINGS.

Write us for details.

* Patent Applied For.

The GRIFFITH LABORATORIES, Inc.

In Canada—The Griffith Laboratories, Ltd.

CHICAGO 9, 1415 W. 37th St. • NEWARK 5, 37 Empire St.

LOS ANGELES 58, 4900 Gifford Ave. • TORONTO 2, 115 George St.

The Year Advertising Helped

IN 1954 we had a business recession in the United States. Sales fell about 4% during the year. If management had followed the historic pattern of business ups and downs, advertising volume would have fallen much further.

But in 1954 the volume of advertising did not fall. It increased over 5%. Every effort was made to stimulate sales when sales were needed to sustain prosperity.

This was something entirely new under the sun. It had a powerful influence in making the recession of 1953-54 one of the mildest on record. It helped greatly to speed business on to the record-breaking levels it has attained today.

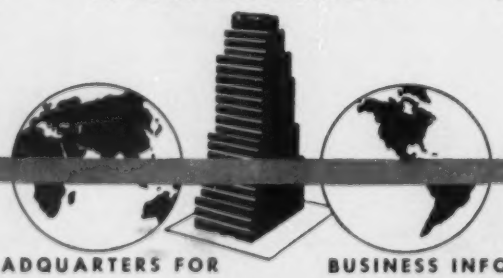
There are several reasons why America's business management attacked this decline in sales with more advertising. One of them grew out of the greatly strengthened position of the American consuming market. Consumers' income after taxes has been rising an average of over $10 billion a year since 1946, and this rising income is more widely distributed than ever before. Furthermore, consumers have piled up reserves of about $215 billion in cash or its equivalent. These reserves offer a new and powerful inducement to increased selling and advertising effort even in the face of a possible decline in consumer income.

Taking the Longer View

However, the principal reason why a sales decline was attacked with increased advertising is management's new-found conviction that good advertising is essentially an investment in the development of a market. Successful development requires sustained investment. The inclination of business management to take this longer view, is, of course, motivated by the fact that the American market, with over 3 million consumers being added annually, is growing at a prodigious rate.

Ten years ago only a handful of companies had plans for investment in new producing facilities extending beyond the current year. Today almost all leading companies have investment programs running some years ahead. And keeping pace with these long-range business investment plans has been the development of sales and advertising programs to

McGraw-Hill
PUBLISHING COMPANY, INC.
330 West 42nd Street, New York 36, N. Y.



HEADQUARTERS FOR BUSINESS INFORMATION

Kill a Business Recession

reach tomorrow's greatly expanded markets.

This crucial role of advertising in providing driving power for our economy is gaining greater recognition every day. In his recent book, "People of Plenty," Professor David M. Potter of Yale University remarked: "Advertising is not badly needed in an economy of scarcity, because total demand is usually equal to or in excess of total supply, and every producer can normally sell as much as he produces. It is when potential supply outstrips demand—that is, when abundance prevails—that advertising begins to fulfill a really essential economic function."

Advertising's Key Role

Today abundance so completely prevails in the United States that it has been conservatively estimated that as much as a third of everything offered for sale falls in the realm of "optional consumption." That is, consumers can "take it or leave it" without any immediate personal inconvenience. But if they decide to "leave it," a terrific economic depression will not be far behind. In such circumstances, advertising—in which, in all of its forms, we are now investing about $9.2 billion annually—clearly is of crucial importance to our continued prosperity.

In performing its key role in past years, American advertising never realized its full potential. It successfully promoted sales. But it never was called upon to promote an overall economic stability as a direct outgrowth of increased sales.

By successfully promoting both sales and economic stability, as it did in 1954, advertising surely has added new strength to the American economy. It has also added a great new and constructive dimension to advertising itself. This accomplishment gave great significance to the celebration of the first National Advertising Week in February, 1956.

One of the surest means of expanding your sales volume in today's $150 billion *industrial* market is through dominant advertising in the publications directly serving your major customers and prospects.

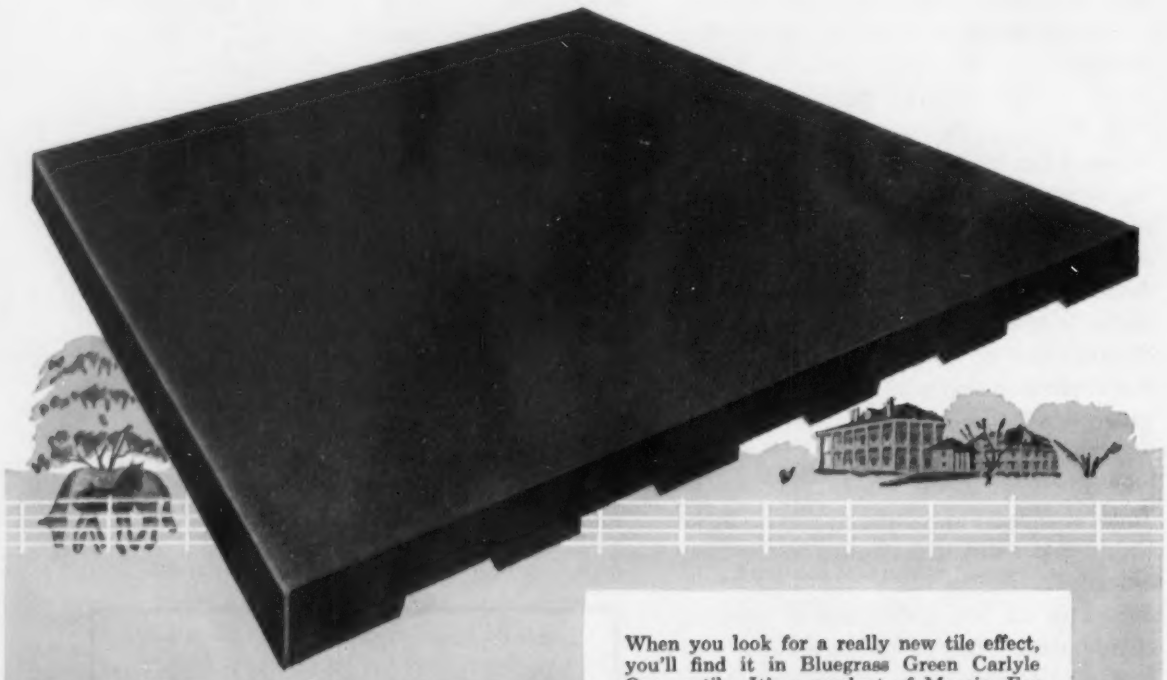
McGraw-Hill's business and technical publications can give you quick access to the men who initiate, specify and approve the purchases of industrial products and services. Because all are leaders in their respective fields, you are assured a maximum return on your investment when you specify a McGraw-Hill publication to carry your advertising to your most important markets.

Only Mosaic offers you *green* Carlyle Quarry tile . . . Bluegrass Green . . . a beauty in itself or combined with your choice of other Carlyle Quarry tile colors.

Now! Bluegrass Green Carlyle Quarry Tile

...the *New* color in Quarry tile!

This versatile new Bluegrass Green tile performs on the job as dependably as all Carlyle Quarries. Won't fade or wear under hard use. Vitreous. Requires an absolute minimum of maintenance. Sizes: 6″ x 6″, 6″ x 2¾″, 4″ x 4″ and 2¾″ x 2¾″. All sizes are ½″ thick. Limited selection of trim shapes. Installed cost somewhat higher than other Quarry colors.



When you look for a really new tile effect, you'll find it in Bluegrass Green Carlyle Quarry tile. It's a product of Mosaic. For your copy of the Carlyle Quarry Tile Catalog, write Dept. 25-1, The Mosaic Tile Company, Zanesville, Ohio.

Most colors and sizes of Carlyle Quarries are readily available. Ask your tile contractor or Mosaic representative for details.

Carlyle Quarry Tile . . . the only complete line of quarry tile

a product of

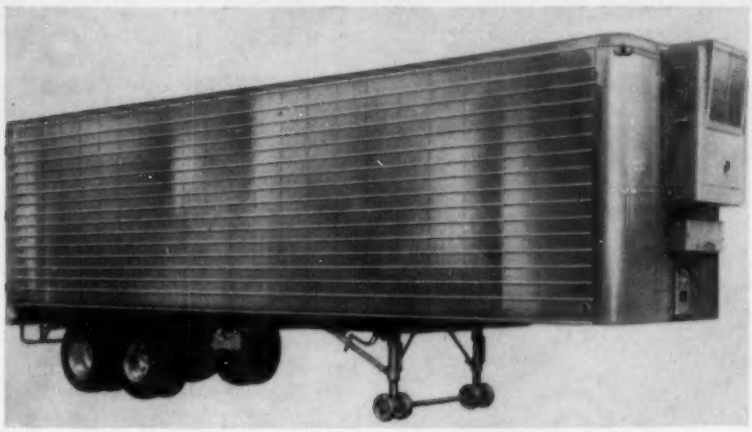
THE MOSAIC® TILE COMPANY

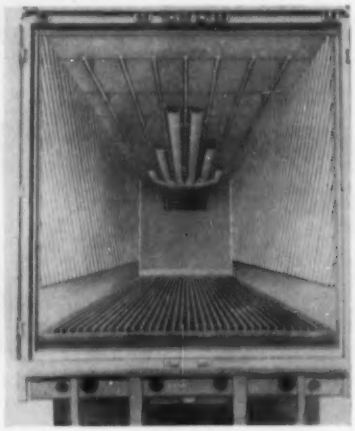
America's largest manufacturer of ceramic floor and wall tile

Member—Tile Council of America and The Producers' Council, Inc. Over 5000 Tile Contractors to serve you

Showrooms, Warehouses and Factories from Coast to Coast . . . **WAREHOUSES & SHOWROOMS:** Atlanta, Baltimore, Boston, Chicago, Corona, Calif., Dallas, Denver, Detroit, El Segundo, Calif., Fresno, Greensboro, Hartford, Hempstead, L.I., N.Y., Hollywood, Ironton, Little Rock, Matawan, Miami, Minneapolis, New Orleans, North Hollywood, Philadelphia, Portland, Rosemead, Calif., Salt Lake City, San Diego, San Francisco, Seattle, Tampa, Washington, D.C., Zanesville. **SHOWROOMS:** Milwaukee, New York. **REPRESENTATIVES:** Buffalo, Cincinnati, Kansas City, Oklahoma City, Pittsburgh. **FACTORIES:** Zanesville & Ironton, Ohio, Matawan, N. J., Little Rock, Ark., Jackson, Miss., Corona & El Segundo, Calif.

NEW EQUIPMENT & SUPPLIES





New Insulation Boosts Trailer's Operating Efficiency

Greater payload volume and significant operating economies are reported advantages of this smooth aluminum-panel refrigerator truck, called Volume Van. Improved performance is attributed largely to an advanced Styrofoam insulation (made according to Hasko-Struct technique).

It provides up to 25% greater efficiency when new, and accomplishes this figure with 2 in. of insulation rather than the 3 in. used on previous installations. The difference in thickness alone enables a 5% gain in payload.

Moreover, physical properties of the insulation permit further vehicle-weight reduction. First, Styrofoam is inherently light which makes for light-weight construction. But more important it does not absorb water, which would add continuously to vehicle weight as well as impair insulating efficiency.

According to the maker, as much as 1,000 lb. of water may be picked up within a year by absorbing-type insulations. And with insulating efficiency down, over-stressing of refrigeration equipment raises operating costs.

The van has a maximum of 35 ft. outside length, 34 ft. ¾ in. inside length, 83 ⅞ in. inside height, and inside width of 87⅞ in. Minimum weight is 12,625 lb., which includes the refrigeration unit.

Insulation is installed in panels with interlocking joints sealed by epoxy resin. This forms a solid, continuous wall not pierced by fastenings or other devices capable of conducting heat. Styrofoam is locked against outer wall of trailer by special clips with staggered gripping teeth. These penetrate the plastic and grip the material so that each clip, with additional epoxy-resin binder, resists a pull of 685 lb.

Trailer's inner surface is a sanitary fiberglass-reinforced polyester skin which is bonded to rigid, corrugated aluminum backing. Latter is in turn contour-bonded to the insulation. Corrugations, which are ½-in. deep, assist air circulation throughout the trailer. These panels are factory installed as a prefrabricated sub-assembly, while the ceiling consists of a 3-in. thickness of the same material.

Stainless-steel meat rails are suspended from the roof on hangers held by rigid, deep-extruded aluminum members built into the ceiling. These tubular rails are removable.

Also mounted on the roof are six anodized-aluminum air ducts located between the rails and proportioned in length to give uniform air distribution. Ducts, together with corrugated side walls and floor, permit air circulation throughout the entire pay load.

The front wall is a 2-in. insulated panel with an interband of hard plywood, which increases resistance to impact and load movement. Floor structure not only furnishes adequate support for the load, but is also a part of the air-circulating system. It comprises deep-duct corrugated aluminum mounted on a stainless-steel subfloor. Here, a 3-in. Styrofoam liner provides the insulation.

Rear doors are made of the same plywood used for the front wall. Each door is secured with its own cam lock and sealed with two vinyl plastic gaskets.

For extremely low-temperature hauls, this van will be available with 4-in. of insulation.—*Fruehauf Trailer Co., 10967 Harper Ave., Detroit 32.*

Circle 115A on Reader Service Card

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Printable Double Wrap Protects Perishables

A new technique of rotogravure printing on the inside of a clear Saran film, which is then laminated by adhesive to another sheet, is designed to isolate the print from oils, solvents, and surface scratching.

Applications for the film (Saran-O-Lam) include packaging of meat, dairy, and confectionery products, which are thus doubly protected from oxidation, and moisture or gas penetration. With printing inks interlocked between two sheets of fused film, rough handling cannot obscure the package label, nor can inks or other foreign matter contact the product. In addition, use of special laminant increases tensile strength of the two-ply, double-webbed film.

Material is produced in roll, sheet tube, bag, or pouch form, in any commercial dimension. Like or unlike gages can be laminated together, depending on the product.—*Printon Corp., 304 E. 23rd St., New York City 10.*

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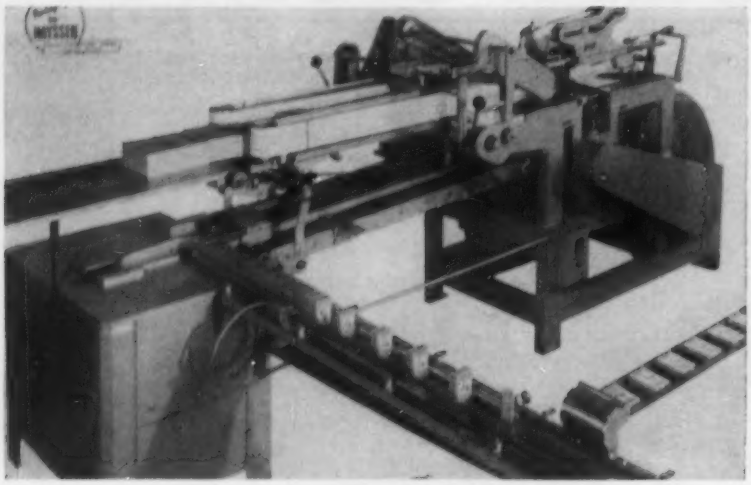

Automatic Bundler Economizes Unit Packaging

Gathering of small packages into one large unit is an efficient, fully automatic operation for this machine.

Called Accumulator and Bundler, it eliminates carton and bag costs, also saves hand-filling labor. At the same time, products receive maximum packaging protection.

In operation, unit takes a variable number of individual packages from a single-line feed, stacks them into a neat arrangement, and automatically overwraps them with paper, film, or foil. It handles containers of any size and shape—rectangular, cylindrical, or tapered.—*Hayssen Mfg. Co., Sheboygan, Wis.*

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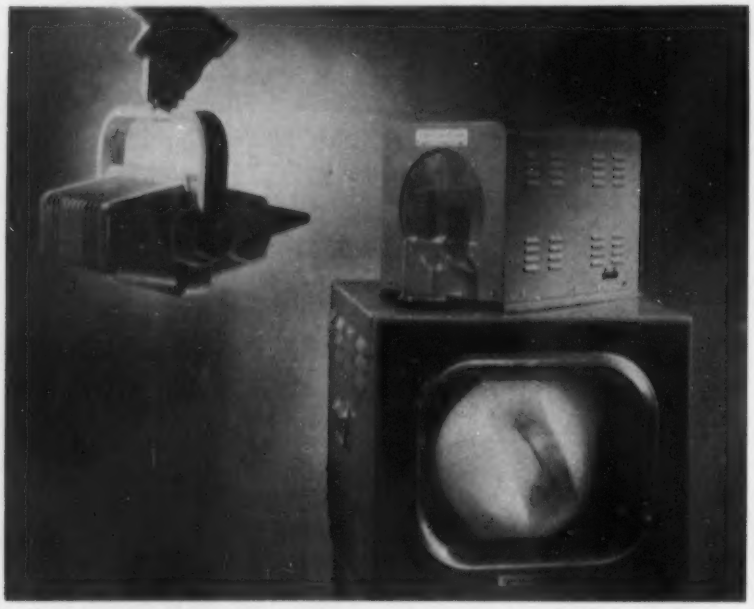


Combined X-Ray, TV Setup Probes Package Contents

Seen increasing the potential of the X-ray technique as a quality-control instrument is a new unit that produces an image with 10,000 times the brightness obtained on a conventional fluoroscopic screen. Shown above is the TV-intensified image of a candy bar containing a bobby pin. It is presented on a TV screen for easy closeup- or remote-viewing in full daylight.

This system eliminates need for placing inspectors in darkened rooms, and for using high X-ray intensities to achieve a visible image. Not only can the image be brightened, but it can be magnified (limited by size of TV tube) to further enhance inspection. Equipment weighs less than 150 lb.

System has been used successfully for checking insulation on heating elements of household appliances.

In operation, X-ray beam passes through the object being examined (on a conveyor belt, for example) and strikes a photo-conductive layer of lead oxide, which has been "painted" on the inside of a special 8½-in.-dia. TV pickup tube. A low-speed (250 v.) electron beam reads the latent image by scanning it and presents it—electronically amplified—on a viewing tube similar to the type used in conventional TV.

Original X-ray intensity and voltage can be greatly cut, thus reducing the hazard to personnel and, therefore, requiring less protective shielding. With the image displayed on a TV set, a number of TV "slave" receivers can be coupled to the "master" receiver and viewed at various locations throughout a plant at any distance from the inspection area.

In addition, the signal can be recorded on magnetic tape and kept for a permanent record, or the image may be photographed.—*General Electric Co., 4855 Electric Ave., Milwaukee 1.*

Circle 116B on Reader Service Card

Cementable Teflon Tape Has Many Applications

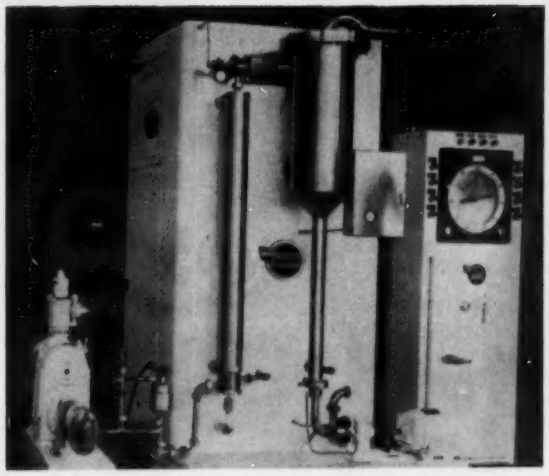
Teflon tape, treated for cementing with any commercial adhesive is offered for use on metal, glass, wood, or plastic surfaces.

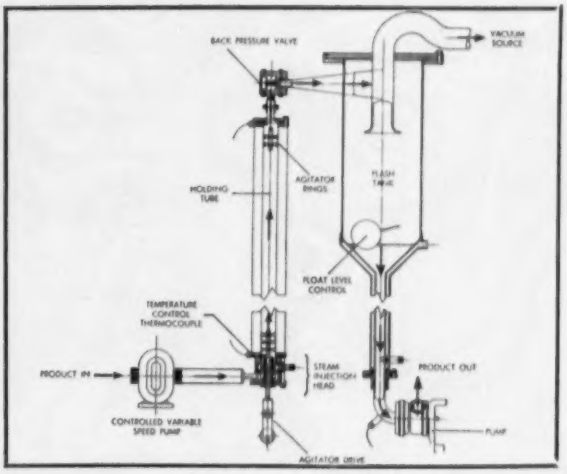
Thin-section (down to 5 mil.) applications offer a non-adhesive sanitary surface with zero water absorption, chemical inertness, and broad service-temperature range.

Typical services include: Facings for conveyor and packaging-machine guide rails; easy-to-clean work surfaces; low-friction linings for hoppers and tanks for uniform feed of powdered materials without sticking; and coverings for baking pans, cookie flats, and bakery rolls.

Tape, 5-60 mil. in thickness, is available in continuous rolls up to 12 in. wide. Sheets ⅛ in. thick come in sizes up to 24 x 24 in.; ¼ in. thick, up to 48 x 48 in.—*United States Gasket Co., Camden 1, N. J.*

Circle 116C on Reader Service Card





New HTST Exchanger Controls Product Temperature, Moisture Content

More efficient and economical HTST sterilization of a wide variety of liquids and semi-solids is the aim of this new heat exchanger, called Roto-Jet. It may be coupled with an aseptic-canning system, although its principles can readily be tailored to other processes.

In operation, steam under pressure is injected directly into the product, thus there is no intermediate surface for heat-transfer loss. Steam is dispersed by a special injection head which prevents localized overheating. And a constant supply of purified steam is maintained through use of a steam strainer, filter, washer, and desuperheater.

Two characteristics of this unit offer efficient and dependable operation: Product-temperature control within ½ deg. F., and accurate moisture control by an automatic vacuum system that permits easy adjustment for specific requirements.

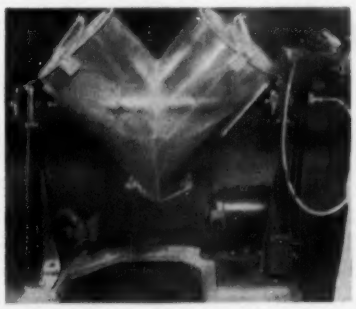
Basically, the exchanger consists of product pump, steam-injection head, holding tube, back-pressure valve, and a flash chamber equipped with discharge pump. Holding tube is constructed with a series of alternately pitched baffles attached to a reciprocating shaft. This design permits precise sterilization values by providing a constant, turbulent flow through the holding tube.

Sufficient back pressure is maintained by a diaphragm-type valve to prevent flashing in the injection head and holding tube. A sanitary float control, located in the flash tank, holds product level constant by controlling speed of product pump. This produces a positive head against the flash-tank discharge pump at all times.

As shown in diagram, product is drawn through a variable-speed pump into the steam injection head. It is then instantaneously heated to processing temperatures up to 300 F. After being heated, it remains in the holding tube long enough to provide desired sterilization.

Following the holding period, sterile product is instantly cooled in the flash tank and drawn out of the flash chamber by a centrifugal pump.—*W. F. & John Barnes Co., 301 S. Water St., Rockford, Ill.*

Circle 117A on Reader Service Card



Blends Liquids, Solids In Single Operation

Liquids and dry materials may swiftly be blended in one operation with use of this new unit.

Designed as an integral part of maker's twin-shell blender, the liquid-feed modification consists of an improved intensifier bar which revolves inside the blender. Liquid flows from a hollow feeder tube within the bar onto a revolving offset disk. Droplets are flung from the edge of the revolving disk by centrifugal force. This slinging action, combined with wiping of dry material on the disk, achieves effective dispersion. A cylindrical wire cage surrounds the intensifier bar and revolves with it to prevent formation of clumps.

Unit will enable blending of melted shortening into ready-mix bread and cake flours. Spice makers can add the oleoresins to sugar and salt bases. And for carbonated beverages, flavoring emulsions may now be added to granular mixes with greater ease and at less expense.

Average operating time is 10-15 min. for blending materials that formerly required several hours. Extremely viscous liquids may need half an hour, while those with viscosities up to 1,000 cps. have been tested successfully.

Machine is offered in capacities of 3-50 cu. ft.—*Patterson-Kelley Co., E. Stroudsburg, Pa.*

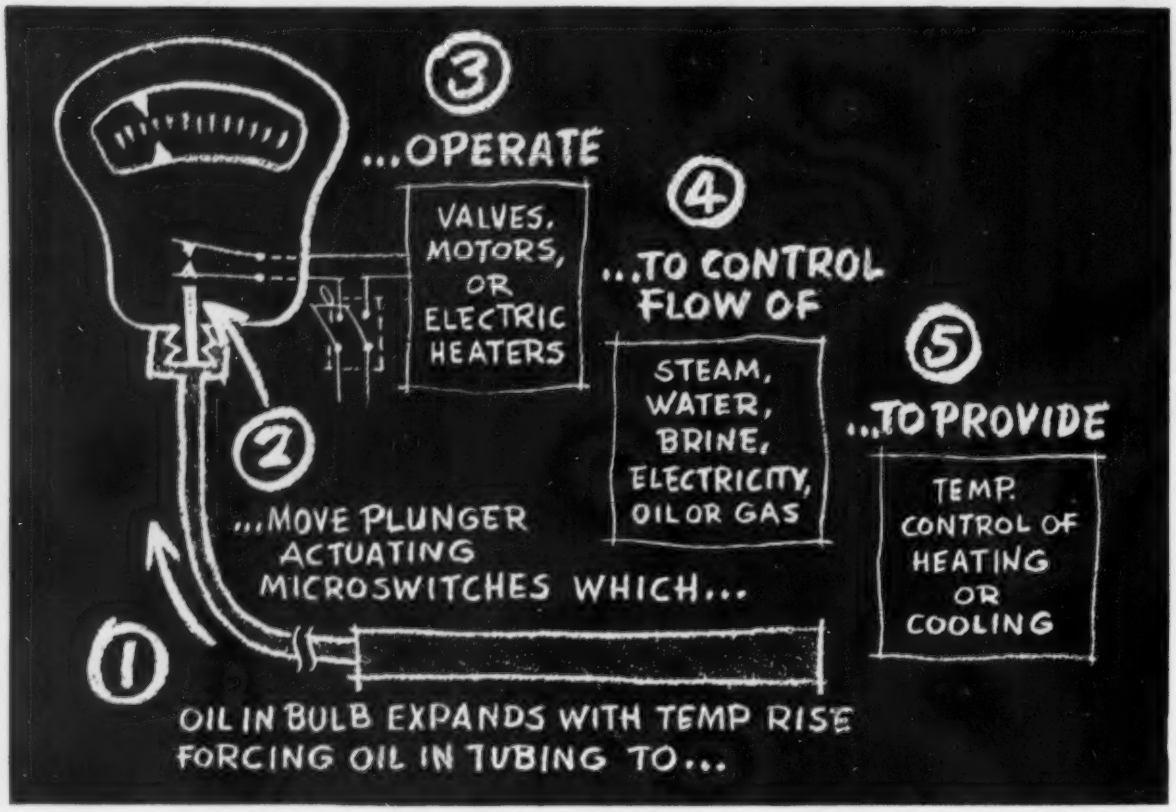
Circle 117B on Reader Service Card

Automatic Chlorine Gage Guards Beverage Taste

Developed primarily for beverage processes, this instrument automatically detects the presence of chlorine in beverage water.

Even in trace amounts, chlorine causes an off-taste and can otherwise affect product quality. With the detector, however, this condition is quickly noted and may be corrected before many cases have been bottled.

Compact unit samples water from the purifier once every hour. Sample



INDICATING
Automatic / Temperature Control

It's simple...dependable!

That rough sketch above tells the story. It shows Sarco's simple electric indicating temperature control . . . and what it can do for you.

Really mighty simple, isn't it? Yet, it's adjustable, indicating and provides dependable accuracy to ± ½°F. No gadgets that call for a technician to read and repair! So simple, so trouble-free . . . maintenance is seldom, if ever, needed.

Turn one knob to change the temperature control setting. Large, easy-to-read scale shows you both the actual and the set temperature.

SEQUENCE CONTROL

And this Sarco electric temperature control is versatile . . . it offers you many sequence combinations such as:

- **Step-heating**
- **Heating and cooling**
- **Wide limit control**
- **Temperature control plus operation of signal devices**

Cost . . . only about $100! It's good economy to specify AUTOMATIC temperature control for ALL control jobs, not just the big ones. So mail the coupon now for complete information.

SARCO

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

Please send information on your simple, inexpensive temperature controllers:

☐ **Self-powered type for use on**_____

☐ **Electric indicating type for use on**_____

Name_____

Firm_____

Address_____

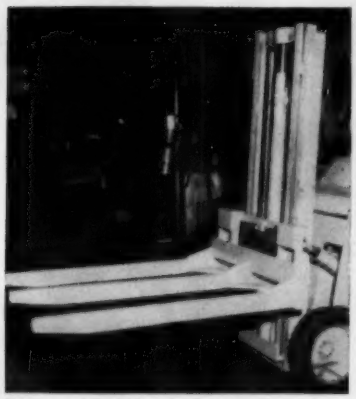
City_____ **State**_____

3147-B

flows into a small center cell flanked by comparison cells. One contains a known color standard, the other clear water.

Indicator solution is added to the sample cell. If residual chlorine is present it is readily shown by a yellow color. A manual switch also permits sampling at any time.—*Infilco Inc., P. O. Box 5033, Tucson Ariz.*

Circle 117C on Reader Service Card



Keg-Handling Attachment Ups Loading Efficiency

A non-hydraulic, keg-handling attachment that fits all lift trucks is designed to boost efficiency of route-loading and storage-room operations.

Capacity of 350-lb. unit (Keg Handler) is 2500 lb. It safely carries six containers at a time—quarters, halves, or kegs. Attachment fits flush with truck apron or load bar, and is quickly installed.

Furthermore, unit handles pallets by using its arms as forks.—*Kughler Development Corp., 117 E. 129th St., New York City, 35.*

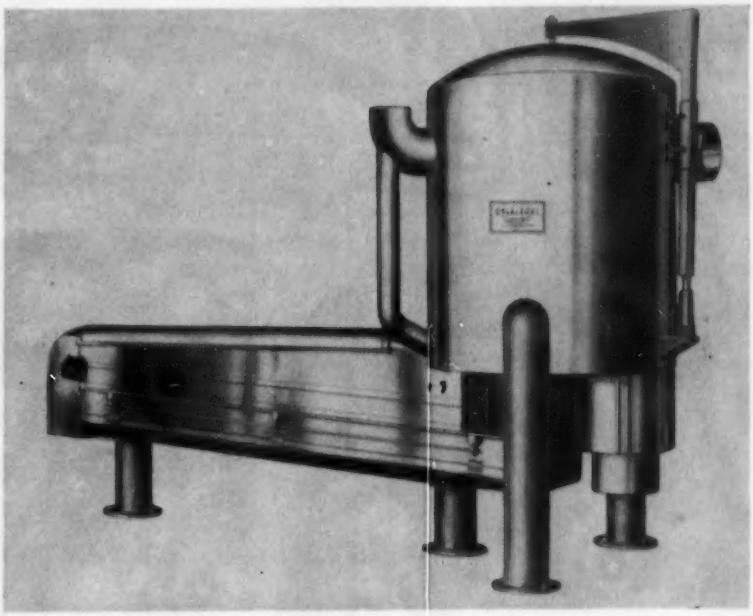
Circle 119A on Reader Service Card

New Packaging Material Is 3-Component Sheet

Wide application is seen for a new heat-sealable packaging material offering printability and high strength plus resistance to moisture, grease, and odor.

Known as "Foilar," its properties result from a combination of three materials in a single sheet. Polyester film (Mylar) is used for strength, aluminum foil for moisture resistance, and vinyl film for heat-sealing qualities. — *Rap-in-Wax Paper Co., 150 26th Ave., S. E., Minneapolis.*

Circle 119B on Reader Service Card



Continuous Hop Separator Uses New Principle

Seen increasing the speed and ease of removing hops from wort is an advanced continuous separator offered in four capacities from 5-40 bbl. per min. Unit (Whirlpool) employs centrifugal force, but requires no pump or outside power source. Instead it uses the hydrostatic head of wort in the brew kettle for separating action.

These space-saving machines are made entirely of stainless steel and have a minimum of moving parts, hence maintenance costs are reduced. Separators are available in two styles. One provides brackets for direct mounting on a hop jack or hot-wort tank. The other has an integral wort receiver.

In operation, unit's separator cone remains stationary, while motion is supplied by flow of hot wort, which the separator bowl directs against the side of the separator cone. Wort swirls down into the perforated cone where 90% of it drains through. Separated portion flows to wort-holding tank or hot-wort pump.

Simultaneously, separated semi-dry hops tumble through the cone discharge and fall onto a conveyor bed below. Latter has several sections of slotted screens. Slow-moving rakes gently push the hops over the bed as balance of wort drains off into a trough leading to the wort-holding tank. This screw-free conveyor eliminates rupture of hops and extraction of bitter flavor. Finally, sprays sparge the hops as they pass over the conveyor bed and drop to waste.

For easy cleaning, separator's cone turns through a 180-deg. arc. This enables quick flushing of the bowl as well as easy washing of the cone. Conveyor-bed screens are easily removed by one man for scrubbing. Furthermore, entire machine is cleaned in 10 min.—*Louis DeMarkus Corp., 3080 Main St., Buffalo 14, N. Y.*

Circle 119C on Reader Service Card

Electronic System Logs, Controls Process Variables

Continuous, automatic control of complex processes may be accomplished with an advanced scanning and logging system called Trans-Scan-Log.

It summarizes all data on a section of graphic panel and an adjacent panel of miniature indicating and recording receivers. Data is transmitted pneumatically or electrically, and covers such variables as temperature, pressure, flow, level, load, density, pH, conductivity, viscosity, stress, and speed.

The compact system enables an operator, sitting at a control desk, to instantly visualize, evaluate, and act upon every process irregularity as it occurs. Scanning is at the rate of one point per second. A signal light indicates the station being scanned and the existing condition—white for normal; red, above normal; and amber,

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Flavors by Firmenich enjoy a preference for their high concentration, olfactive purity, and fidelity. They are the product of laboratories where pure research and practical application are pursued in the most favorable atmosphere. They come to you to stimulate your development of new products and to enhance the appeal of those you now make. Our services, both of supply and helpful suggestion, are yours to command.

FIRMENICH INCORPORATED

below normal. Logging can be set for any time interval.

An off-normal condition also produces an audible alarm as time, point value, and station appear in lighted blocks at top of graphic panel. Simultaneously, the same information is printed by an auxiliary column printer.

Audible signals can be acknowledged by operator, but signal lights remain on until the process condition is remedied. The auxiliary printer can be set to print the return-to-normal conditions following process upset, or it can continue to print the off-normal values each time the off-normal point is scanned.

In addition, operator can read any process point on demand by pressing station selector buttons. Complete logging of all points can be called for at any time.—*Taylor Instrument Companies, Rochester, N. Y.*

Circle 119D on Reader Service Card

Stainless Sausage Trap Has Sanitary Design

Now offered as a completely sanitary unit, this sausage trap uses Alnico permanent magnets encased in stainless steel.

Adapters on its white Neoprene outer casing permit installation on the stuffer. Traps are available for fine grinds and emulsions (Model 190SS), and for course grinds such as salami (Model 195SS).

In addition to accessibility for cleaning, unit has high resistance to corrosive meat grinds and liquids. Magnets have life-time guarantee in normal use, and service consists of daily removal of iron particles.—*Cesco, 4025 Sebastopol Rd., Santa Rosa, Calif.*

Circle 121A on Reader Service Card

Perishables Protected in Advanced Rail Car

Major engineering advances—in refrigeration equipment, insulation, and body design—are cited for a new railroad car that expedites shipment of perishable foods.

Called "Frigifrater", it maintains any temperature between −10 F. and 65 F. by use of cold-wall refrigeration. Blowers feed air ducts around the all-steel, all-welded car lining with captive refrigerated air.

Refrigeration is transmitted through the cold wall into the sealed lading compartment for keeping foodstuffs both moist and cold. Use of dry, captive air cuts defrosting cycles to once every seven days.

The diesel refrigeration power unit has been redesigned to elimiante many relays, voltage regulators, starters, and charging generators. This provides a more compact unit requiring minimum service.

Insulation between car body and inner cold wall is of an inorganic foam which bonds itself to both surfaces and adds to structural strength. It does not pack down or absorb moisture, thus prevents corrosion of hidden steel surfaces.

An important property in actual operation over the rails is separation of car body from its steel underframe. Within practical limits, fiber supports and cushioning devices permit the body to slide freely over the underframe. Therefore, refrigeration equipment and lading are protected from damage caused by slack action of the train, or from bumping in normal yard switching operations.

A further advantage to shippers is a novel door arrangement that permits speedy loading and unloading by forklift trucks. Usually cars are built with 4-ft. doors to minimize refrigeration loss. They are too small for automatic trucks and must swing outward to open, which creates clearance problems at loading platforms.

For overcoming these difficulties, this unit has doors that swing out only 13 in., then roll back along the side of the car to provide an 8-ft.-wide opening. Also, special locking devices and insulation guard against refrigeration loss.

Also of interest, car is constructed so that entire refrigerated unit can be lifted from the underframe and transported—in full operation—by ship.—*General Motors, Electro-Motive Div., La Grange, Ill.*

Circle 121B on Reader Service Card

Versatile Creamery Hose Is Heavy-Duty Unit

Of interest to dairymen and other food processors is a new creamery hose available in five sizes from ¾-1½ in. i.d.

Known as "Dari-Preen", it can be supplied either with capped ends or a tapered nozzle. Its white cover, of synthetic rubber, is termed highly resistant to butter, animal fats, and fish and animal oils. The tube is designed for continuous operation with superheated water.

Working pressures range from 100-200 psi. depending on size. Hose, reinforced with heavy cotton ply, weighs 43-93 lb. per 100 ft.—*Thermoid Co., Trenton, N. J.*

Circle 121C on Reader Service Card

Why buy a truck in the dark?

"Oh, kick me!" cries Merchant Neal,
In a posture hardly genteel.
He bought trucks in haste,
Then the costly fact faced,
That he'd missed the Dodge Dealer's Deal!

If you buy a new truck after looking at only one make, it's like making a deal in the dark. A smarter way to buy is to "*spotlight*" *real truck* value—weigh and compare competitive claims with these Dodge truck facts:

Most standard V-8 horsepower of all leading makes—½-ton through 3½-ton range. You'll make faster trips—get more work done!

Shortest turning radius. You'll maneuver in traffic, and park more easily.

Biggest cabs, with biggest wrap-around windshield. You'll enjoy more comfort, safer vision.

Highest payload capacities . . . pick-ups providing up to 22% more payload than others.

Prices down with the lowest.

Next truck you buy, don't deal in the dark. Turn a bright light on the facts. See Dodge before you buy.

GET THE DODGE DEALER'S DEAL BEFORE YOU DECIDE

DODGE
Job-Rated
TRUCKS
WITH THE *FORWARD* LOOK

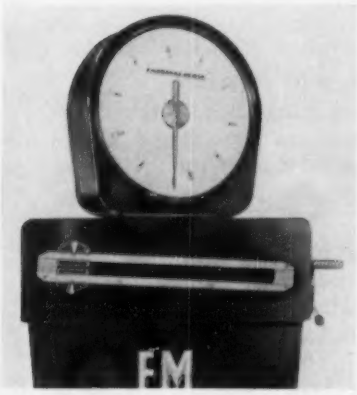
Electrically-Heated Tape Has Many Applications

Heating of frozen water pipes, cold syrup or oil lines, and valves are applications for a knitted heating tape called Electrothermal. Further, it is suitable for surfaces with double curvature.

Current-carrying resistance bands are insulated on both sides by layers of glass yarn, which permit safe winding of tape on metal. Also, insulation on both sides minimizes heat loss. Tape can be stretched or squeezed to fit equipment. It does not buckle and may often be repositioned without rewinding.

Units are available in widths of ½, 1, 2, and 3½ in., lengths of 2, 4, 6 and 8 ft.—*Arthur S. LaPine & Co., 6001 S. Knox Ave., Chicago 29.*

Circle 123A on Reader Service Card



Four Improvements Mark Precision Dial Scale

For greater ease and accuracy of weighing, especially under difficult operating conditions, this cabinet dial scale (Floaxial) incorporates four innovations.

They are a direct-reading dial, full-swivel head, cage-type central column, and a controlled-speed dash pot.

The direct-reading dial enables operator to use drop weights and still read total net weight at tip of dial indicator. This speeds up weighing and eliminates errors. It does away with adding the weight obtained from a drop-weight window to a second weight shown at tip of indicator.

In addition, the tare assembly also has been redesigned. Rustless metal poises have open faces that expose all graduations etched on the chrome-plated stainless-steel bar. At the center of each poise is a large turquoise "V" that ends in a sharp red tip, which attracts the operator's eye.

Full-swivel head permits dial charts to be turned in directions other than facing the scale platform. A differential mechanism between cabinet and head allows full 360-deg. swiveling at a touch of the hand. Head can be locked in position or left to rotate.

The central column, resting on a heavy base, supports the complete weighing system and prevents errors due to deflection in transmitting a weight from platform levers to dial mechanism. All levers are supported in this solid unit with the pendulum mechanism fastened to the column top. This construction guards against misalignment of weighing components by accidental denting of the cabinet.

As further protection against hard usage, dials have a new hydraulic shock absorber and oscillation damper. It automatically adjusts to provide the impedance necessary to counteract any shock coming from the scale platform.

This control first absorbs the shock of a load dropped on the scale. Then it immediately allows the indicator to move to the proper weight—backward or forward—at a controlled speed. The control automatically decreases its action as correct weight is neared. Thus, indicator settles freely on the exact weight.

Available are 36 models which range in total chart capacity from 500 lb. by ¼-lb. graduations to 120,000 lb. by 20-lb. graduations.—*Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5.*

Circle 123B on Reader Service Card

Lightweight Conveyor Eases Warehouse Operation

Handling pieces heavier than its own weight, this aluminum conveyor (Ve-Be-Veyor) is offered for floor-to-floor operations, as a booster for gravity lines, and for loading and unloading of trucks.

Unit has a flanged channel frame with special cross members for rigidity and strength. Staggered, hard-maple rollers with self-lubricating bearings support a 12-in.-wide rubber-covered belt that is driven by a powered roller chain. Conveyor is powered by a ¼-hp., single-phase motor (115 v) with reversing drum control and gear-reduction unit.

Power unit can be removed in seconds and its source is an ordinary light socket. No pulley adjustments are required at either end of the belt. Further, special carrying-belt design prevents it from running off-center.

Conveyors are available in three sizes: 12 ft., 149 lb.; 16 ft., 192 lb.; 20 ft., 235 lb. Weights include power unit.—*A. B. Farquhar Div., Oliver Corp., 102 N. Duke St., York, Pa.*

Circle 123C on Reader Service Card

The Craft Cooler Corporation, Chicago, features the cleanability of stainless steel in its new sweetwater bulk milk cooler.

is CRUCIBLE STAINLESS

both inside and out

This handsome new milk cooler offers the dairy farmer many advantages: it eliminates milk cans and can-handling — milk goes from cow to cooler to truck. It saves time . . . minimizes waste . . . helps the farmer realize top prices for the milk he produces.

What's more, the cooler is almost entirely stainless steel. This means it will last a lifetime with little or no maintenance . . . it will never stain or corrode . . . it will clean to a bright, gleaming finish in minutes . . . and, since stainless doesn't impart "taste" to milk (or any food product), it will assure the quality and flavor dairies expect in the milk they buy.

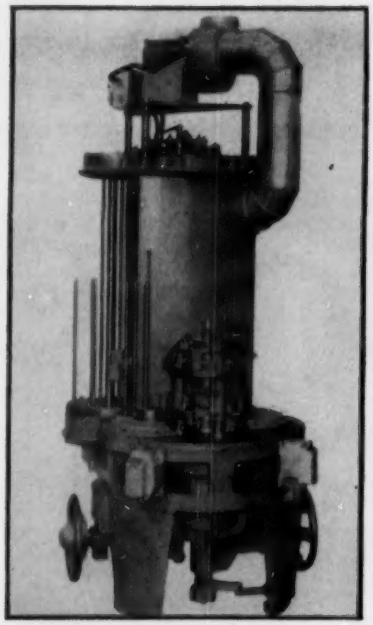
Stainless steel can bring these same advantages to your plant or dairy equipment. That's why it quickly pays for itself in anything from tanks and pasteurizers . . . to bottlers, piping and fittings.

For detailed information on the profitable use of stainless steel, Crucible offers you a free, 20-page booklet, "Making the Most of Stainless Steel in the Dairy Industry". Why not send for it now? *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pennsylvania.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor — Railway & Power Engineering Corp., Ltd.



Lines, Dries Can Ends At 600 Per Min.

This compound liner and dryer processes 202 to 404 can ends at up to 600 per min. in a completely automatic operation.

Adapted to solvent- or water-base coating compounds, unit (No. 501) deposits a pre-measured amount of coating liquid into the lid's curled edge channel. Compound feed nozzles may be placed vertically or tilted up to 15 deg.

Lining compound, entering a housing at the bottom of the machine, flows through a tube in its center post into a distributor flange. From there, it is fed through a flexible hose to a valve in each lining head.

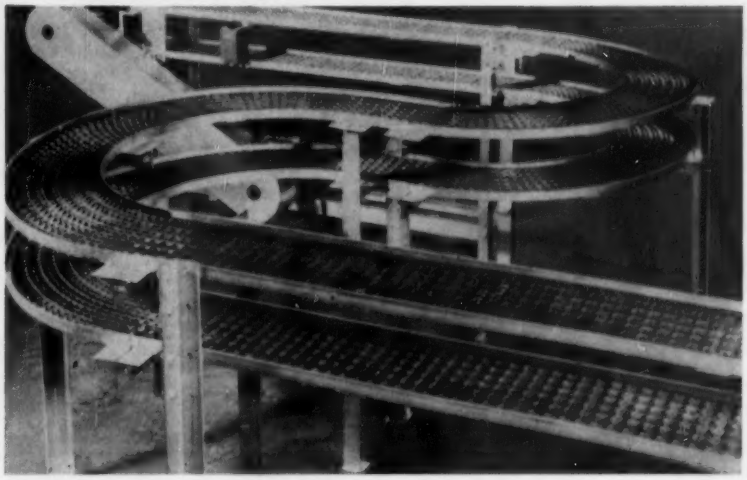
After coating, a lower chuck descends flush with a table where a 6-pocket, rotating circular plate transfers can ends to the dryer. This section is enclosed to retain fumes of solvent-base compounds, which are vented by a suction blower mounted on the top.

When water-base compound is used, air is pushed down through the dryer where it is discharged near the bottom and recirculated by way of the furnace. Gas fumes from the isolated combustion chamber as well as saturated air are vented outside the building.

In the dryer, ends are fed to eight vertical rotating screws which automatically raise them between two guide rods. On top, a spring-loaded arm rotating around a cam discharges the ends to a revolving plate, which has buttons for pushing them into lower stacking screws.

The revolving plate, being bottom-fed, permits removal of can ends from the top, thus eliminating interference with machine operation. Power is supplied by an explosion-proof motor underneath the dryer.—*Baldwin-Lima-Hamilton Corp., Hamilton, O.*

Circle 125A on Reader Service Card



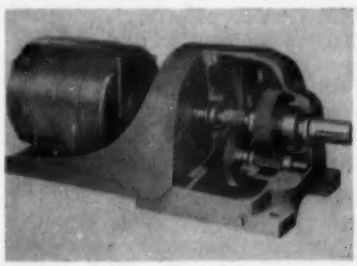
Flexible Belt Solves Tough Conveying Problems

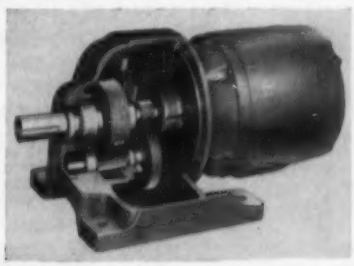
Where obstacles or unusual plant layout present material-flow problems, this flexible conveyor system offers economical installation and low maintenance costs. Typical applications: drying, sorting and packing.

Known as Omniflex, it is a modification of maker's flat-wire belt and turns within 2½ times its width. Currently, the belt is available in widths from 4 in. to 4 ft. in mesh of ½ x 1 in.

Unit is designed to provide a conveyor that flows around corners and poles. It eliminates transfer plates and labor costs in handling materials from one conveyor to another.—*Ashworth Bros., Inc., Winchester, Va.*

Circle 125B on Reader Service Card





Compact Drives Provide Economical Service

Functional design without unnecessary size and weight is a reported advantage of a new line of drives.

Developed for economy in heavy-duty service, and minimum maintenance, units' compactness is achieved through a unique arrangement of hardened gears. Ratio changes are simplified through use of only one low-speed gear set per drive size. And all operating parts are readily accessible.

Quiet operation is attributed to precision machining and use of rugged cast-iron housings. A one-piece housing with just an input cover and two shaft openings offers oil tightness, while seals retain oil and prevent dirt from entering the housing. Output speeds range from 280 rpm. down to 6 rpm.

An integral, positive-locking back stop is available with any of the drives. It can be readily installed without additional parts or modifications.

Shown in photo, left, is unit (Mo-

Hoerner Boxes, Inc.
has been keeping company with
Lipton Tea *for 7 years...*

Hoerner's fast service and sturdy quality have been Lipton's cup of tea for over 7 years. We're proud of Lipton's loyalty, but the point of this ad is this—if you process the cream or sugar (or any perishable food), Hoerner will do the same good job for you.

Call in a Hoerner Packaging Engineer and let him prove our point.

Phone or write the office or plant nearest you.

HOERNER BOXES, INC.

GENERAL OFFICES—600 Morgan St., Keokuk, Iowa • PLANTS—Keokuk, Des Moines and Ottumwa, Iowa Sand Springs, Oklahoma • Fort Smith and Little Rock, Arkansas • Sioux Falls, South Dakota Minneapolis, Minnesota • Fort Worth, Texas • Mexico City, Mexico

Equipment & Supplies

torgear) for applications where heavy shock loads must be handled without damage, and where continuous operation makes down time especially costly.

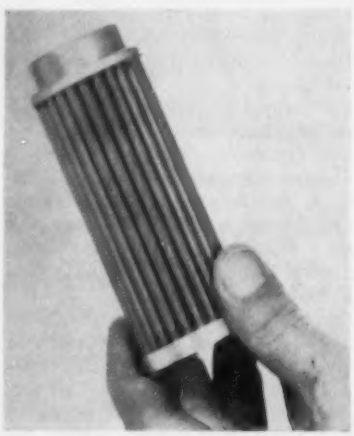
Rigidity of the high-speed shaft and pinion is provided by a straddle-mounted pinion, which withstands shock, reversing, and heavy loads. The motor can be replaced quickly by removing four bolts and separating the coupling, while a mounting bracket facilitates rapid realignment. Draining of oil is unnecessary.

Double-reduction units with ratios from 6.2:1 through 38.4:1 transmit up to 60 hp. Triple-reduction drives have ratios from 47.1:1 through 292:1 and transmit up to 20 hp.

Unit at right (Gearmotor) with flange-mounted NEMA motor may be set on floor, wall, or ceiling. The flange is standardized, one size per motor, to permit use of universally applicable motors.

Double-reduction drives have ratios from 6.2:1 through 31.4:1 and transmit up to 30 hp. Triple-reduction units with ratios from 38.4:1 through 292:1 transmit up to 20 hp.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 125C on Reader Service Card



Versatile Sintered Filter Removes Minute Solids

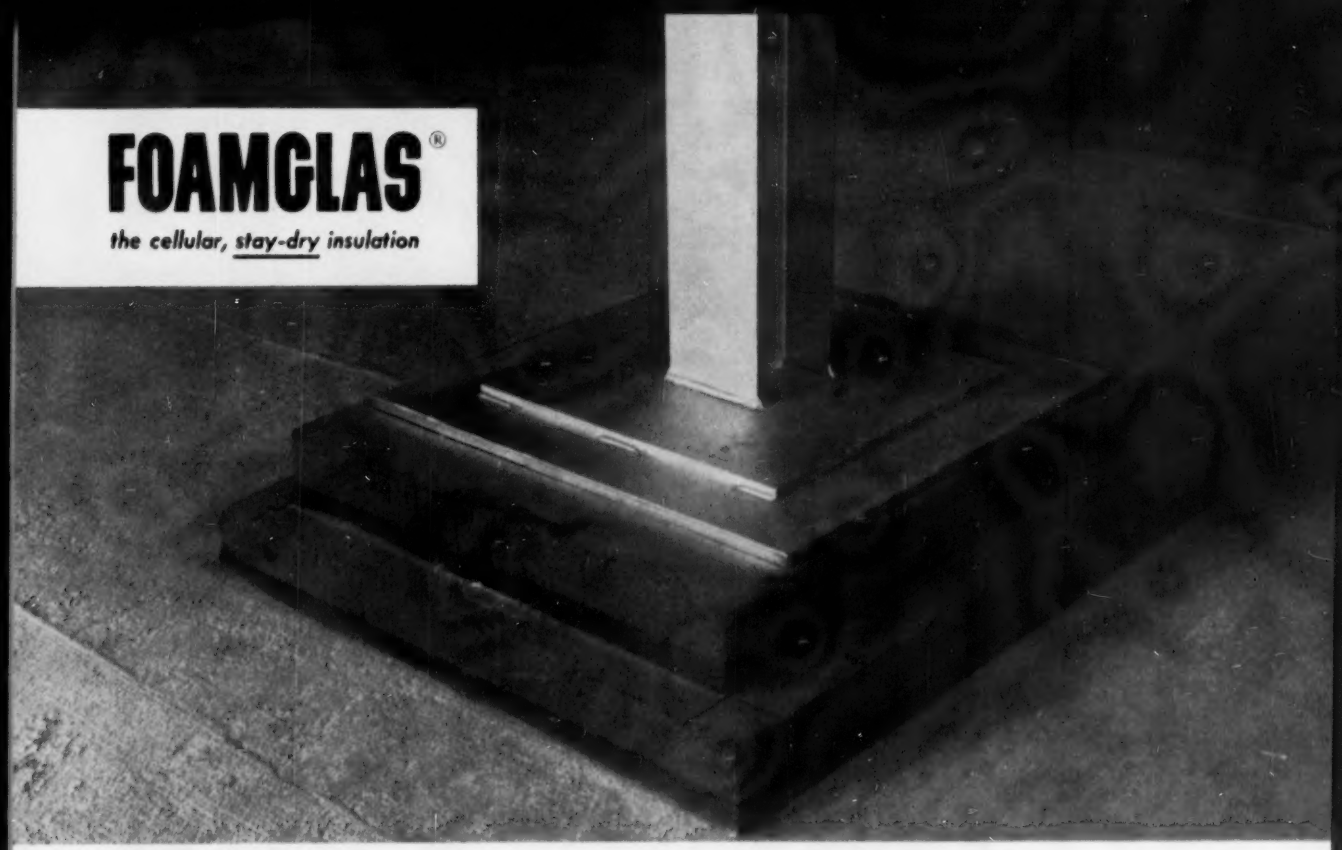
This unit is designed to filter particles as small as 1-micron from fluids at high rates of flow.

Filter's controlled permeability and uniform porosity may be varied for different pore sizes. Either internal or external threaded connections are provided. Threads are used as seals to replace packings which may cause difficulty above 400 F.

The one-piece sintered element can be made in a variety of diameters and

FOAMGLAS®

the cellular, stay-dry insulation



President Carl Steimle of Southern Michigan Cold Storage says...

"The weight of our new warehouse actually rests on FOAMGLAS floor insulation"

"FOAMGLAS floor insulation actually supports much of the weight of our new refrigerated warehouse." That's the report from Carl Steimle, president of Southern Michigan Cold Storage Company, Sodus, Michigan. They picked strong, stay-dry FOAMGLAS to insulate not only the floor, but also the roof, ceilings and all walls of the new building, first stage in a $1½ million building program.

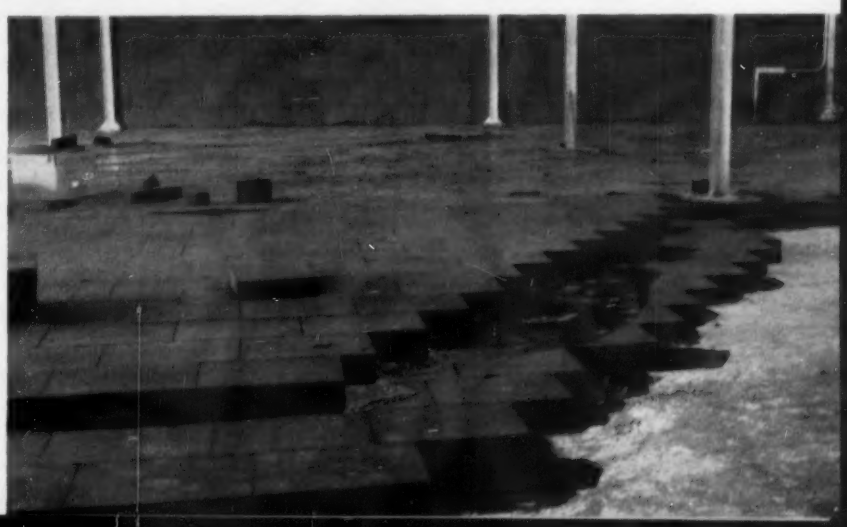
This unique all glass insulation has a compressive strength of over 7 tons per square foot. Mr. Steimle says, "That made it possible to prevent thermal 'short circuits' by putting insulation *between* all load bearing columns and other structural members. All columns bear directly on FOAMGLAS without reducing its insulating performance."

FOAMGLAS can't absorb the moisture that cuts efficiency of other insulations. "The result," concludes Mr. Steimle, "is *constant*, precise control of temperatures (from —35 to +35F°), and we don't have the headache of recurring insulation replacement."

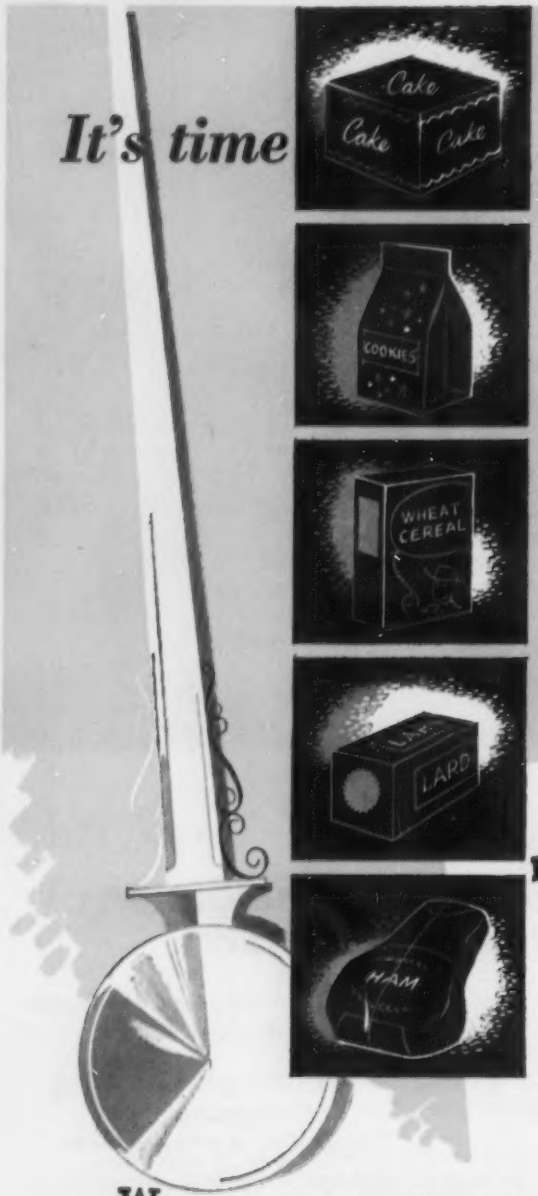
These benefits will be *yours* when you insulate your buildings, piping or equipment with FOAMGLAS. Prove it to yourself with six simple tests which you can perform in your own office. Write today for a free sample and complete testing directions.

Pittsburgh Corning Corporation

Dept. O-36, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor St. W., Toronto, Ontario



Two layers of 4" FOAMGLAS insulate the entire floor area. There are no thermal "short circuits" since all load bearing columns rest directly on this remarkably strong insulation (see close-up, above).



It's time ...to ask your suppliers for IONOL®, C.P. *impregnated packaging...*

newest, low-cost way to protect foods against oxidative spoilage

When fats and oils migrate from food product to box or wrapper, they rancidify quickly, causing deterioration of flavor and aroma.

The effective way to combat this serious threat to product shelf life is to incorporate Ionol, C.P.—a most efficient antioxidant—into the boxboard or wrapping material. Rancidity is then stopped right where it begins, at the *surface*.

In actual tests, baked goods stored at 85°F in Ionol, C.P. impregnated boxboard cartons, were free of rancidity at the end of ninety days. Without Ionol, C.P. protection, baked goods stored under similar conditions, often develop rancidity within a week.

When your food products contain fats or oils, Ionol, C.P. impregnated boxes or wrappers will greatly prolong shelf life. Additional protection can be assured by using Ionol, C.P. as a direct ingredient in your food products.

Ask your packaging materials supplier for this modern way to protect the good name of your brand label. Write to Shell Chemical for names of suppliers of Ionol, C.P. impregnated packaging.

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IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver

lengths. Its radial fin construction comes in specified depths and number of convolutions to give extended area within a confined space. Filters of stainless steel, Monel, and other metals are available for temperatures up to 1,000 F., pressures to 500 psi.—*Purolator Products, Inc., Rahway, N. J.*

Circle 126A on Reader Service Card

Permits Private Paging Of Key Personnel

This pocket radio is part of a new system designed to eliminate public-address or bell-type paging of key personnel. Further, no one except the pagee knows that a message is being sent.

Called Handie-Talkie, system consists of a selector console with individual buttons for key personnel, an FM transmitter that radiates alerting tones and voice messages within a confined induction-loop area, and individual all-transistorized radio receivers.

To activate a particular receiver mechanism, a receptionist merely presses the proper selector button, then speaks the message into a desk microphone. Employed are matched vibrating-reed mechanisms—one in each pocket receiver to correspond with another activated by the console selector button.

Receiver weighs only 10 oz., and is slightly larger than a pack of king-size cigarettes. It can be carried in a pocket or worn on a belt.

Unit is powered by a 4-v. mercury cell battery and reception is termed excellent. Battery life is about four 40-hr. weeks, while operating cost is only 3c. per 8-hr. day.

Up to several hundred persons can be paged individually when additional channel capacity is added. No FCC

MATHEWS Engineers and Builds a complete line of CONVEYING MACHINERY

A typical Mathews Package Conveyer system, helping to create a continuous flow of material through this modern plant.

WHATEVER your material handling requirements might be, there is equipment in the complete Mathews line to meet them. Whether you need Gravity or Power Conveyers—Roller or Wheel, Belt or Live Roller, Drag Chain or Overhead Trolley, or special conveying machinery—Mathews builds them all, best for you.

50 YEARS OF MCC MECHANIZED HANDLING

MATHEWS CONVEYER COMPANY

GENERAL OFFICES . . . ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIV., MATHEWS CONVEYER COMPANY WEST COAST, SAN CARLOS, CALIFORNIA

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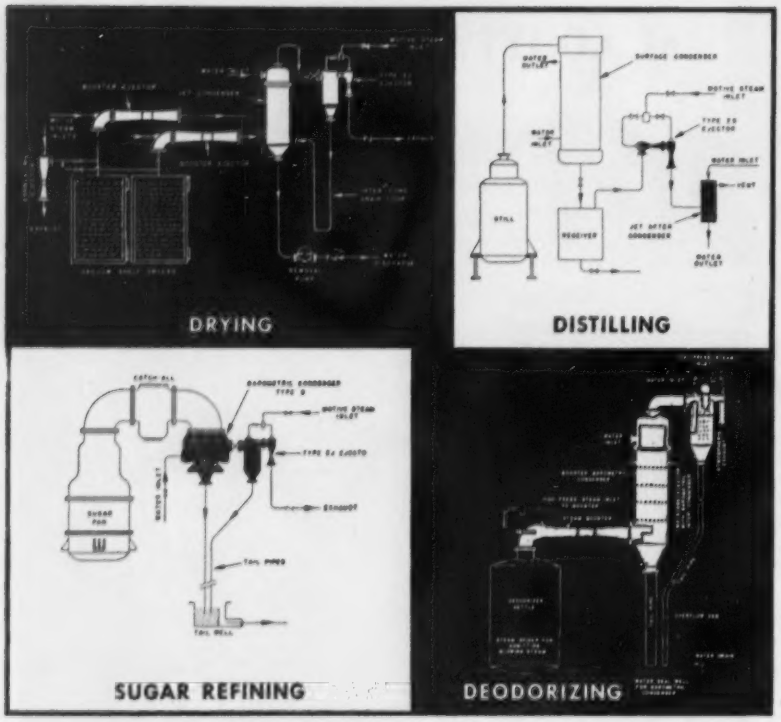
Engineering Offices or Sales Agencies in Principal American and Canadian Cities. Export Representative—Foreign Trade Division of New York Hanseatic Corp.

MATHEWS

FOR EFFICIENT VACUUM PROCESSING
C. H. WHEELER
STEAM JET EJECTORS



C. H. Wheeler has always led in the development of the steam jet ejector and its application to the vacuum process field. Today, our cumulative engineering experience gives you the benefits of low initial cost and reliable operation. You get flexibility in design and installation and efficiency, over a wide field of application. C. H. Wheeler Tubejets provide large volume removal of gases or vapors at very high vacuum, with low operating and maintenance costs. There are no moving parts. Operation is simply the opening and closing of valves. Long life is assured. Write for Catalog No. 1462. Representatives in principal cities.

TYPICAL USES IN FOOD PROCESSING

- VACUUM REFRIGERATION
- DRYING
- DISTILLING
- SUGAR REFINING
- COOLING
- DEHYDRATION
- DEODORIZING
- FILTERING
- EVAPORATING

C. H. Wheeler

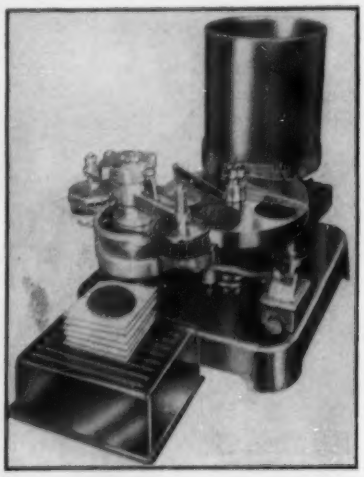
C. H. WHEELER MANUFACTURING CO., 19th & LEHIGH, PHILA. 32, PA.

Steam Jet Ejectors • Vacuum Refrigeration • High Vacuum Process Equipment • Marine Condensers and Ejectors
Steam Condensers • Centrifugal, Axial-and Mixed Flow Pumps • Micro-Particle Reduction Mills • Deck Machinery

Equipment & Supplies

license is required because system uses restricted signal radiation, rather than far-ranging radio signals.—*Motorola Communications & Electronics, Inc.*, 4501 W. Augusta Blvd., Chicago 51.

Circle 129A on Reader Service Card



Foods Shaped, Stacked By High-Speed Unit

This automatic food shaper reportedly produces up to 5,000 uniform patties per hour for freezing or canning. Portions are stacked and interleaved with paper liners for ease of handling.

Applications include chopped and laminated meats, corn beef hash, and fish and crab cakes. Machine (Model 4A-P) adjusts for patty weights up to 8 oz., and requires only one unskilled operator. Further, its shaping action does not squeeze out juices or bruise the product.

Sanitary nickel-silver construction without painted or plated surfaces offers easy cleaning. And unit can be quickly disassembled without special tools.—*Automatic Food Shaping Co.*, 58 New St., New York City.

Circle 130A on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

Change motors in minutes—

with FALK *all-steel* MOTOREDUCERS

No long and costly "down time" involved

Motors can be interchanged or replaced *in minutes* with the all-steel, All-Motor type FALK Motoreducer. No long and costly "down time" is involved in making the change!

Best of all, replacement is not limited to original make of motor—new NEMA frames may be substituted for old. This versatile Motoreducer operates with any make, speed or type of standard foot-mounted motor within its AGMA rating. No modification, no special shaft, no "partial" motor required.

In addition to unmatched motor interchangeability, this dependable gear drive—the "work horse of industry"—offers: widest choice of output-shaft position (horizontal, vertical, right-angle)...any output-shaft connection...any mounting, including wall and ceiling...standard speed range from 1.5 rpm to 1430 rpm. All these advantages, plus proved efficiency, low maintenance and extra-long life, make the All-Motor type FALK Motoreducer your best buy for any job requirement.

Furnished in sizes up to 75 hp with any make, style or type of motor; or, *without a motor if desired.* FALK Motoreducers are available from convenient factory, field or distributor stocks, from coast to coast.

Write for Bulletin 3100

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

MANUFACTURERS OF:

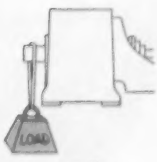
- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

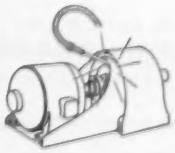
FALK "IN-BUILT" FACTORS assure full dependability—better service—longer life

ALL-STEEL HOUSINGS
Rugged, strong, rigid ...all parts heavy steel plate, formed and welded in the Falk Weld Shop.



LARGE OVERHUNG LOAD CAPACITY
Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum loads.

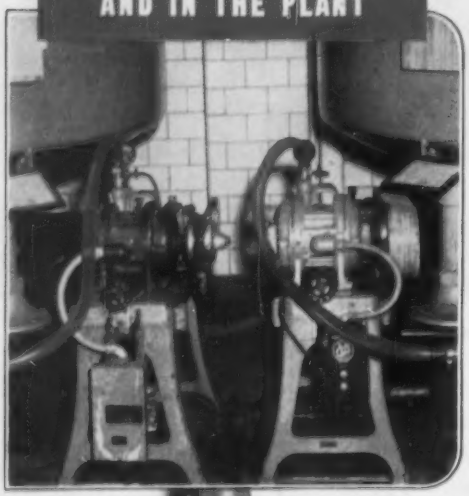
PRECISION GEARING
Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion.



SEALED HOUSINGS
Splashproof, dustproof, oiltight. Dual closures and one-way vents keep oil in, dust and moisture out.

IN THE LABORATORY

AND IN THE PLANT



Flavor-sensitive liquid foods retain all their purity and flavor when piped through Tygon Flexible Plastic Tubing. There is no contamination — no metallic flavor pick-up. Tygon is completely safe for foods because it is chemically inert, non-toxic and resistant to all food acids and alkalies. This has been proven in use in scores of food processes. Small wonder that

FLAVOR-SENSITIVE LIQUID FOODS ARE SAFELY "PIPED" THROUGH TYGON TUBING

leading authorities everywhere have approved Tygon Tubing for use with food products.

This versatile piping medium provides faster, low cost installation too, because it may be installed in long continuous runs without joints or couplings. Flexible, it easily adapts to any layout, and its glass-like clarity provides instant visual inspection of flow at any point. The polished bore, plus the absence of joints and sharp turns, eliminates clogging (especially in the case of semi-solids) and increases flow rates. Even cleaning is easier: Tygon lines may be disassembled, cleaned or steam sterilized—and reassembled in minutes!

Fifty-five bore sizes (1/16" to 2" I.D.) accommodate virtually every plant or laboratory requirement. Simple clamp fittings make for fast, easy coupling and special types of Tygon are available for special service such as vacuum or pressure work.

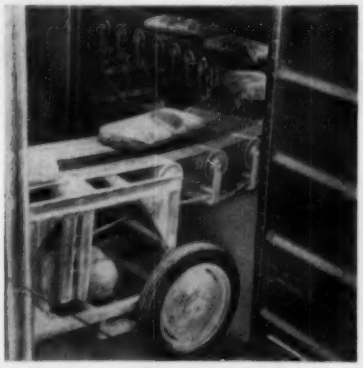
Get the whole story with complete technical data. Write for BULLETIN T-87.

PLASTICS AND SYNTHETICS DIVISION

U. S. STONEWARE

AKRON 9, OHIO

225-E



Snaking Conveyor Eases Box-Car Loading

Designed with finger-tip control, this power-driven box-car loader shuttles in and out of cars and trucks to eliminate hand trucking. It discharges bags at desired elevation at point of final stacking.

Conveyor is a series of steel-spring belts operating over grooved rollers that are hinged together. Entire unit can be propelled, snake-like, through any curve or doorway on a radius as low as 6 ft.

As loading progresses, conveyor is withdrawn while flow of bags continues without interruption. Effective length is unlimited and capacity is 30 bags per min.—*Power-Curve Conveyor Co., 2185 S. Jason St., Denver 23, Colo.*

Circle 133A on Reader Service Card

Pipe Sections Cleaned In Efficient Washer

Turbulence of cleaning solution from high-pressure nozzles of a new manifold system reportedly makes this dairy-plant washer highly efficient.

Known as Jiffix, unit is available in two sizes for accommodating 10 ft. and 7 ft. pipe. There is also adequate space for separator and clarifier elements.

For the large washer, two 10 hp.

NEWS! Important beneficial ingredient in dry food mixes

Now! Where rapid solubility is vitally important, use quickly dissolving Kelco algin colloids in your dry food mixes to improve taste, texture and stability of the finished product.

Use Kelco algin in your dry salad and meat sauce mixes: Kelco algin, a superior emulsion stabilizer is now finding wider and wider use in acidic emulsions. It promotes complete and rapid solubility even when cold mixed.

Use Kelco algin in quick mix puddings, gels and icings: The addition of Kelco algin enables dry mix puddings and gels to set up rapidly and firmly upon simple mixing with either cold or hot liquids. Water gels formed are clear and appetizing, while milk gels are creamier, smoother and tastier. Icing mixes containing this versatile algin are highly soluble and produce a finished icing with finer texture, softer body, and better moisture retention properties.

Yours On Request: "Technical Bulletin" fully describing the application of Kelco algin products in food uses. Without obligation, write for your copy today.

KELCO COMPANY

120 Broadway, New York 5, N. Y.
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530 W. Sixth Street, Los Angeles 14, Calif.
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Chemiseal gaskets and packing

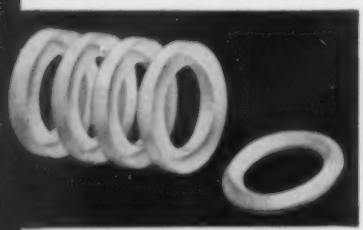
impervious to food acids, alkalis, solvents

made of du Pont TEFLON

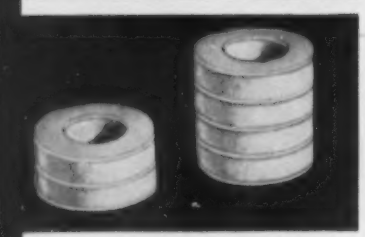
Chemically inert, extremely anti-hesive and with zero water absorption—Chemiseal Gaskets and Packing are ideal for corrosion, contamination and sanitation problems throughout the Food Industry.

CHEMISEAL TEFLON-JACKETED GASKETS are available in any size, with a variety of filler materials suitable for glass, glass-lined, porcelain-lined and metal piping and equipment. These fillers are protected on both faces and the inside diameter by the inert TEFLON Jacket. Catalog No. TG-953.

CHEMISEAL SNAP-ON GASKETS are molded to match contour of conical-end glass pipe. They assure perfect automatic centering of joints and free flow of materials. Made for all standard pipe sizes from ¼ in. to 6 in. Catalog No. TG-953.



CHEMISEAL V-TYPE PACKING is the ideal valve packing that seals with low gland pressures and operating torque. Extremely resilient, tough and anti-hesive—it will not seize the valve stem or shaft even when handling the most difficult solutions. Supplied in sets with square end adapters. Catalog No. TP-1255.



CHEMISEAL PUMP PACKING is extremely effective for rotating and reciprocating shafts. Provides a low friction 2-way seal that not only prevents axial seepage, but also seals against shaft and stuffing box as well. Supplied in sets to meet specific requirements. Catalog No. TP-1255.

Ask your U. S. Gasket-Belmont Packing Distributor or write.

UNITED STATES GASKET CO.
Camden 1, New Jersey

U.S. GASKET • BELMONT PACKING

Equipment & Supplies

motors operate two 240-gpm. volute pumps. These circulate cleaning solution through the stainless-steel system three times a minute. Two 7½-hp. motors drive pumps on the smaller unit. Large tank requires 160 gal. of water heated by outside source, while the smaller one takes 115 gal.

Bacteriological swab tests, conducted in a 35,000-gal. California dairy, prove the action of this machine equal to manual washing. Milkstone deposits need be manually removed only once, and maker estimates that time savings amortize unit's cost in about 6 months. —*Creative Metals Corp., 1290 Powell St., Emeryville, Calif.*

Circle 133B on Reader Service Card

New Ingredients

New Powdered Vanilla Is Stable Flavoring

Longer shelf life is reported for dessert and cake mixes flavored with a new powdered vanilla product.

Known as Sucranilla, it is based on natural vanilla extractives and reinforced with aromatics for fixative value. Thus, greater resistance to light, air, and heat is cited.—*Dodge & Olcott, Inc., 180 Varick St., New York City 14.*

Circle 134A on Reader Service Card

Specialty Starch Boosts Frozen-Food Stability

Shelf life and quality of pre-cooked frozen soups, sauces, and gravies may be improved when prepared with a new specialty starch called Col-Flo.

For use in items that are not initially processed under high temperature, this material is stable at low temperature and during freeze-thaw periods. Further, it does not develop cloudiness in liquid portion when product is stored at 32-40 F.—*National Starch Products, 270 Mardison Ave., New York City, 16.*

Circle 134 B on Reader Service Card

Capsulated Flavors Resist Oxidative Deterioration

A gelatin capsule, termed instantly rupturing and completely soluble, is offered to prevent oxidation of flavors and spices.

Unit may be used in conjunction with a variety of foods—cake and

EASY WAY TO PUT OUTPUT ON THE UPSWING!

shift lubrication methods from

Backward to Forward!

ALEMITE AIR-OPERATED TRANSFER PUMP

gives 63% faster lubricant transfer

...saves right down the line!

The *real cost* of plant lubrication is not just the *lubricant* alone! Actually, it's the time and labor needed to get the lubricant *out* of the original drum—*into* a bucket pump or powergun—and then *applying* it to machine bearings. That's where the real costs add up!

And that's why an Alemite Air-Operated Transfer Pump can cut costs in your plant—especially if you are using old-fashioned hand methods of lubrication. It transfers 37 pounds of pressure gun grease *per minute*—direct from the original drum—completely sealing the lubricant at all times—protecting against mess, waste and contamination.

It's fast—and versatile! It can even handle alcohol, cutting oils, kerosene—almost any non-corrosive non-abrasive fluid you use by the drum. Delivers light fluids at a rate of up to 15 gallons per minute!

There's no better way to speed up your handling of lubricants—because an Alemite Transfer Pump pays for itself by saving man-hours and machine-hours as well!

• A 400-pound barrel of lubricant arrives at the plant—sealed, fresh, "refinery clean."

• An Alemite Transfer Pump is inserted in the bung-hole. It is threaded to fit—completely reseals the barrel.

• In less than a minute a 25-pound bucket pump is filled! No contamination, no air pockets, no mess or waste!

• Now the bucket pump is ready to service hundreds of hungry bearings with lubricant that is protected all the way from barrel to bearing!

FREE! New Booklet:
"5 Plans for Better Lubrication"
Alemite, Dept. FF-36, 1850 Diversey Pkwy. Chicago 14, Illinois

Please send me my FREE copy of "5 Plans for Better Lubrication."

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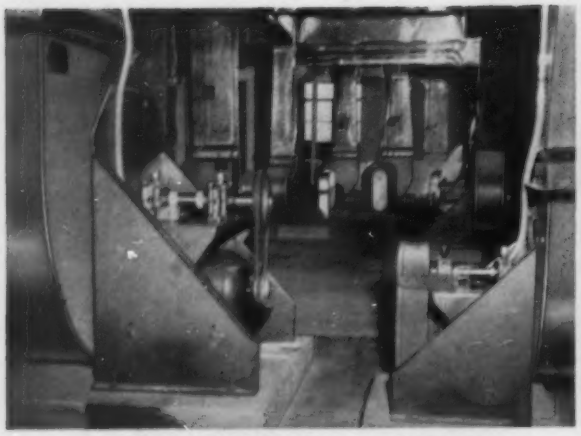
ALEMITE

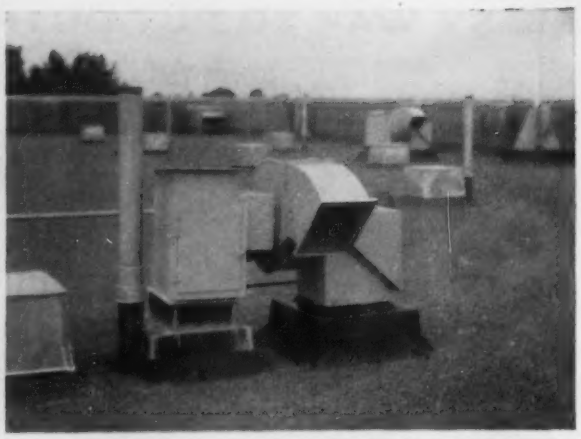
Ask anyone in industry

A PRODUCT OF SW STEWART WARNER



INDOORS — VENTILATION OF ZONES OR WHOLE BUILDINGS

Compact "Buffalo" Belted Vent Sets are easily installed singly or in groups (as above) for varying volume requirements, or for different zones — and new fans can be easily added as ventilation requirements increase.



OUTDOORS — VENTILATION THAT DOESN'T USE FLOOR SPACE

Furnished with all-weather drive, husky Belted Vent Sets are ideal for roof or other outdoor installations. Range of capacities is 500 cfm to 20,000 cfm in this line of extremely quiet, efficient ventilating fans.

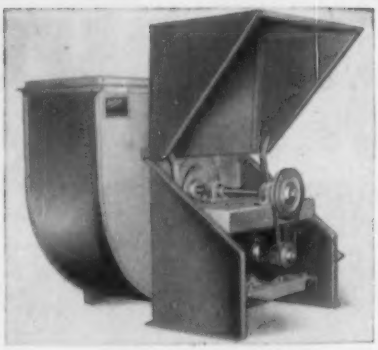
FAN FLEXIBILITY...

TO SIMPLIFY YOUR JOB PLANNING

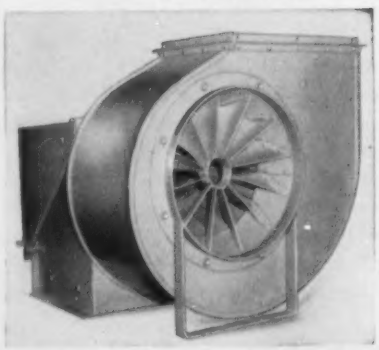
"Buffalo"

BELTED VENT SETS

Whether you're planning a large or small air moving job, these fans will fit right into your plans. Installation can be indoors or outdoors, and their light weight and compact size simplifies the job. You can get large capacity at small-fan cost with multiple-fan installations — for complete flexibility of operation. And when you put "Buffalo" Belted Vent Sets into the plan, you give your customers "Q" Factor performance — built-in Quality that means long life and satisfaction. *Write for new Bulletin 3720A* and data on new model Belted Vent Sets now being used for small induced draft applications.



ADJUSTABLE MOTOR MOUNT permits easy change of pulleys and belts for capacity changes after installation.



HIGH PERFORMANCE is built into "Buffalo" Belted Vent Sets. Note inlet guide vanes which reduce noise and stabilize performance.

"Buffalo"

BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, N. Y.

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

New Ingredients

frosting mixes, packaged pie fillings, desserts, soups, and sauces. A typical application is in pickling, where a pre-measured amount of spice is packaged in the capsule and used to flavor a pre-determined volume of pickle mix.

As a consumer item, capsulated flavorings can replace the more perishable bottles of liquid flavors to eliminate measuring, evaporation, and spillage.

Fill material is hermetically sealed in the shell without exposure to air or contact with foreign matter. Accuracy of fill is ½%, and capsule sizes range from ½ to 25 minims.—*General Capsule Corp., Fraser, Mich.*

Circle 134C on Reader Service Card

New Chemicals

For Safer Plant Floors: High-Friction Coating

Greater slip resistance is reported for floors treated with a new safety enamel applied by brush to a variety of surfaces—wood, concrete, steel (clean or rusty) or aluminum. Its friction factor towards leather and rubber shoe soles is 0.62 dry, 0.92 wet—far in excess of safety requirements.

Coating dries without unpleasant odor in 1 hr., and is ready for use next morning. In addition, it may be applied directly on wet (water) surfaces, which provides safety in areas that are difficult to dry before painting.

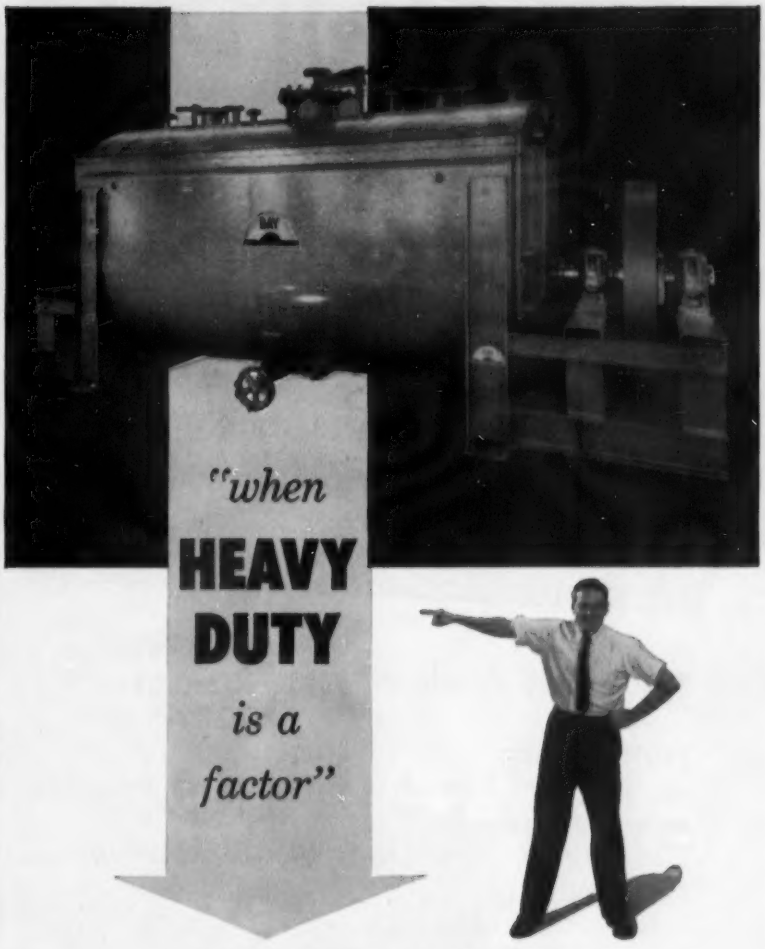
Formulated from an alkyd-resin base, this enamel also offers a wear-resistant surface that is unaffected by alkali cleaners, food acids, oils, or water. Coating is available in three colors—gray, tile red, and black.—*Lawton Products, 228 N. LaSalle St., Chicago.*

Circle 137A on Reader Service Card

Vacuum-Pump Lubricant Dissolves Sludge, Gum

Vacuum-pump operation may be improved by use of lubricants that dissolve troublesome gums and sludge-forming contaminants of evacuated air. A typical application is the solubilizing of gums from a coffee-roasting operation.

Chemically, lubricants (Ucon) are polyalkylene-glycol derivatives. They



DAY JUMBO MIXERS... meet every requirement imposed by heavy loads. For instance, the standard-duty DAY Jumbo Mixer is equipped with two roller bearings mounted on heavy fabricated supports. Heavy-duty units have an extra outboard bearing to eliminate cantilever action or drift. Air- and grease-seal stuffing boxes and 3-piece, dust-type covers are standard equipment. Agitators have a laminated outer ribbon, continuous welded, ground smooth, with outer ribbon having a relieved trailing edge to eliminate rubbing action. Tanks can be equipped with heating or cooling jackets for 40, 60 or 80 psi. Available in 600- to 3850-gallon capacities. For complete information write for Bulletin 800.

in mixing equipment DAY *means longer life span*

FOUNDED 1897

THE J. H. DAY COMPANY

INCORPORATED

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Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products.

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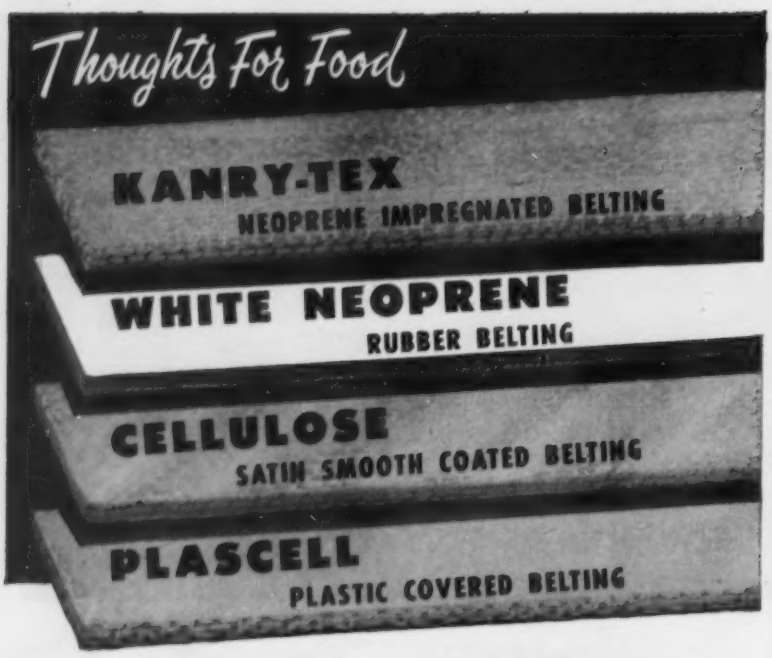
Western Canada: British Canadian Importers, Vancouver, British Columbia
Mexico: T. de la Pena e Hijos, S.A., Nazas 45-A, Mexico 5—D.F.



each specifically developed for: CONVEYING INSPECTING SORTING

PROTECTED FROM
Odor Toxics Soil Taste Fiber Rot Deterioration

RESISTS ANY ABSORPTION
Acids Fats Juices Alkalis Oils Moisture

KANRY-TEX
Completely impregnated. Dense and tough — yet flexible enough even for small pulleys. May be sterilized with hot water or steam. Available in white or brown.

WHITE NEOPRENE
Completely constructed with highest grade neoprene rubber, finished with smooth 3/64" cover. Friction surfaced pulley side. Also available in black. White Ruff or brown Kling Top for incline and decline conveying. Brown friction surface for conveying and sorting.

CELLULOSE
Coated with opaque white or clear amber cellulose on both sides or on carrying side only. Smooth, to prevent clinging particles of food, etc. Washable with soap and water.

PLASCELL
Smooth white plastic surface that will not peel or flake. Easy to care for, can be brushed off, wiped with a damp cloth or cleansed with hot water. Also in green or maroon for simplified sorting, inspecting or sizing.

WRITE FOR COMPLETE BOOKLET
"GLOBE PRODUCTS FOR THE CANNING INDUSTRY"
Send for Test Samples — Write Dept. E

GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET • BUFFALO 6, NEW YORK
KNOWN FOR QUALITY THE WORLD OVER

New Chemicals

are supplied with or without additives in a range of viscosities from 50 to 90,000 S.U.S. at 100 F. Oils are said to have high viscosity indexes, low stable pour points, and excellent lubricity.

Further, they are non-corrosive to metals and do not affect gaskets and seals.—*Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York City 17.*

Circle 137B on Reader Service Card

Briefs . . .

Compact Electrical Panel simplifies wiring, adapts to any combination of motor controls.—*General Controls, 801 Allen Ave., Glendale 1, Calif.* (138A)

Drivers' Depository Chest safeguards cash collections, cuts insurance rates. Unit has upper compartment accessible to driver, lower one to office employees only.—*Meilink Steel Safe Co., Toledo, Ohio.* (138B)

High-Speed Meat Saw permits convenient breaking of front or hind quarters. Easily cleaned unit has accurately aligned blade and moving stainless-steel table with 7 sq.-ft. working surface.—*Toledo Scale Co., Toledo 1, Ohio.* (138C)

New Polyethylene Resin offers closures with greater rigidity, higher gloss, and increased resistance to wear and staining.—*Bakelite Co., 260 Madison Ave., New York City 16.* (138D)

Van de Graaff Accelerator with 3,000-w. output at 3,000,000-v. is powerful and versatile radiation source for food-preservation work.—*High Voltage Engineering Corp., 7 University Rd., Cambridge 38, Mass.* (138E)

Film-Type Evaporator has pivoted rotor blades which produce a thin product film for rapid heat transfer.—*Rodney Hunt Machine Co., Orange, Mass.* (138F)

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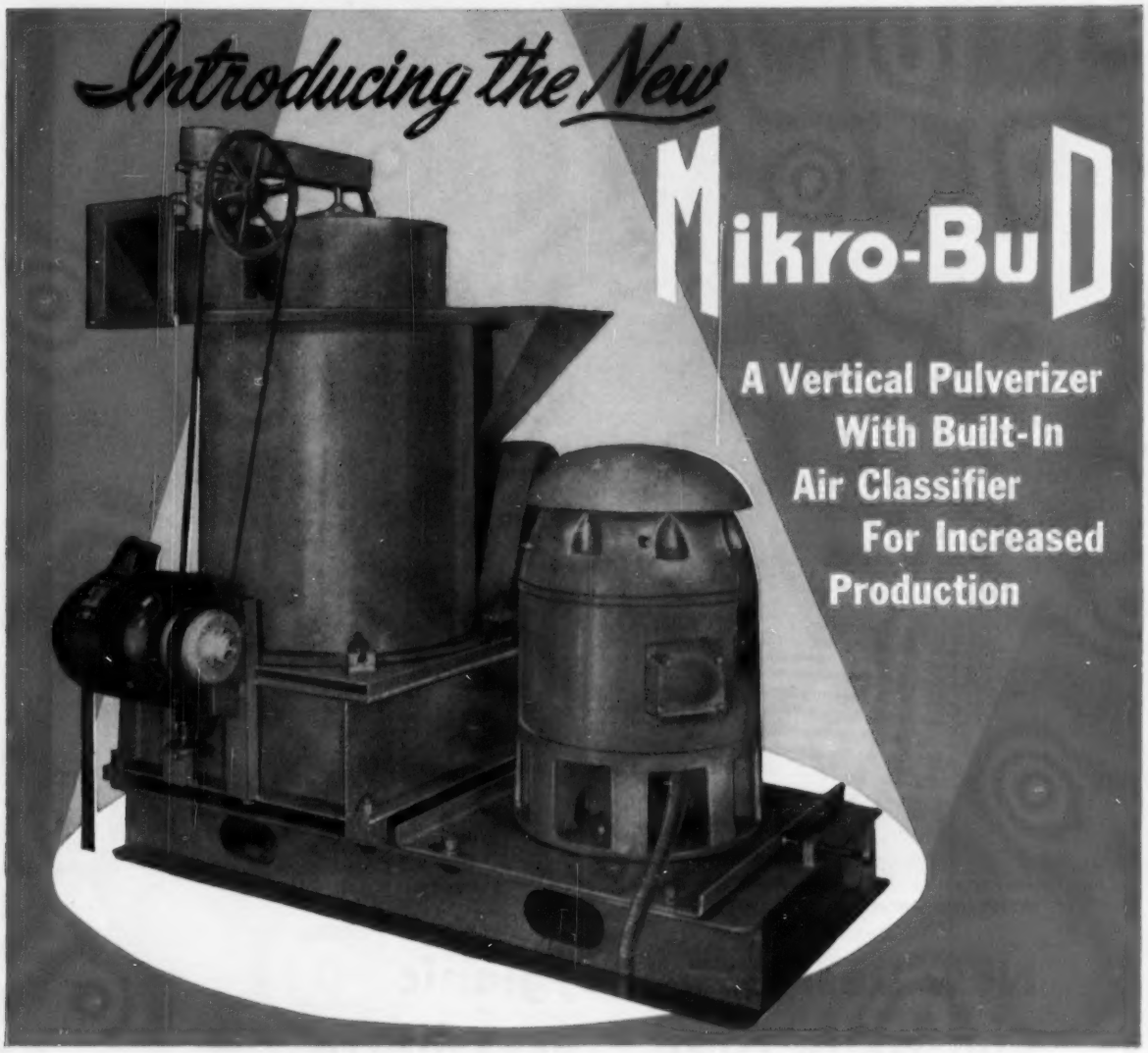
Introducing the New

Mikro-BuD

A Vertical Pulverizer With Built-In Air Classifier For Increased Production



SEND FOR— your copy of new MIKRO-BuD Bulletin and Test Grinding Data Sheet

This new mill, with its instant ability to shift from one particle size to another in grinding operations, is rolling up impressive performance records. By the simple turning of a small hand-wheel the mill can be quickly adjusted over the entire range of its particle size potential in a matter of seconds.

The unit, which comes in two sizes (50 hp. and 5 hp.), has been designed to produce an intermediate fine grind at high capacities. Its power economies, quick cleanability and cool grinding are features which have caused its use to be carefully investigated by discriminating buyers seeking the improved production output which it makes possible.

The MIKRO-BUD will handle a comprehensive range of dry materials for a considerable number of uses in the chemical, food, pharmaceutical, drug, cosmetic, plastic and allied industries. A test of your material on this new unit in the MIKRO Laboratory may supply the answer to increasing your pulverizing production.

Mikro-D

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
97 CHATHAM ROAD SUMMIT, NEW JERSEY

PULVERIZING • AIR CONVEYING • DUST COLLECTING EQUIPMENT

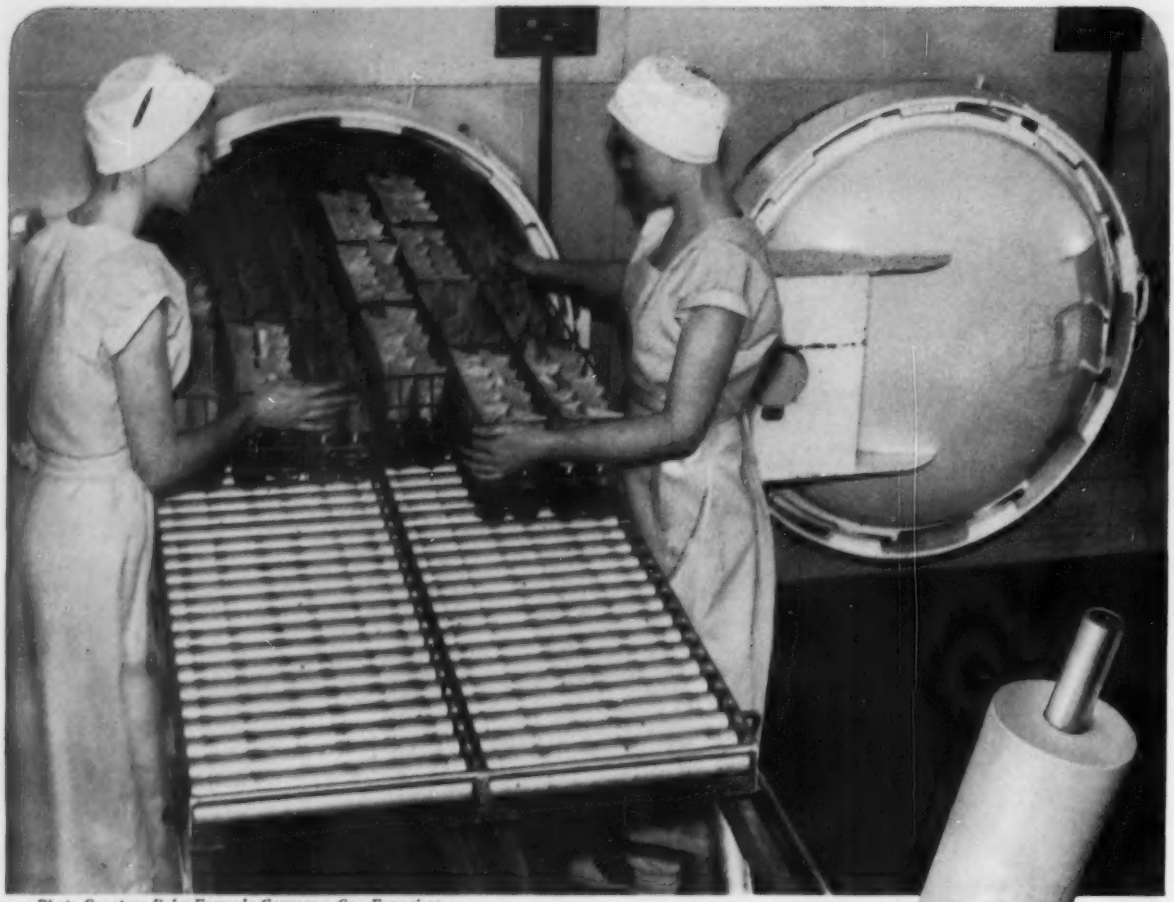


Photo Courtesy Baby Formula Company, San Francisco.
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New Design For Hygienic Control in Food Processing....

Sanitized Pulleys and Rolls— for use in food processing—in the chemical field—anywhere where sanitation and cleanliness are of paramount importance. No exposed metal, no porosity to permit contamination or bacteria build-up. The plastic coated roller cannot erode—is highly resistant to acids, oils, alkalis and greases.

Sanitized Pulleys and Rolls—with their plastic coating are tough, waterproof, odorless and non-toxic. Strong and durable, considerably lower in cost than stainless steel pulleys—with many added features. Full facts are available today. Write or call for our Sanitized Bulletin. Complete line of Red Head Standard Pulleys available for immediate shipment.

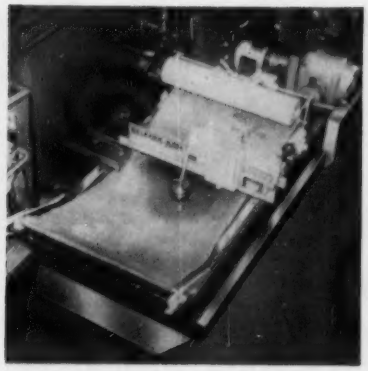
WRITE FOR DETAILS

MERCURY INDUSTRIES, INC.

(PULLEY AND ROLL DIVISION—DEP'T P-61)

HILLSDALE, BERGEN COUNTY, NEW JERSEY • TEL. WEstwood 5-2636

Equipment Applications



Self-Cleaning Paper Filter Cuts Maintenance Costs

This continuous, self-cleaning paper filter eliminated maintenance costs in removing salt and crumbs from overspray coconut oil used in cracker production at National Biscuit Co.

Formerly a settling-type filter with screen required manual removal of sediment—a 90 min. job every 24 hr. Even so, extra time was spent in cleaning spray nozzles fouled with sediment particles.

But with use of the paper filter (Delpark, Industrial Filtration Co., Lebanon, Ind.), nozzles are now foul-free as particles are efficiently removed, and filter material is automatically renewed.

Filter surface conforms to a flat endless conveyor of open construction. Sloping sides form a shallow pool and an inclined ramp provides for removal of solids. Oil filters through by gravity.

Liquid level rises as flow is reduced by accumulated solids. This raises a float which actuates a switch causing the conveyor to carry the filter material forward and bring clean surface under the incoming oil. Conveyor operates for about 1 hr. in each 24 continuous hours of oven operation.

As the oil level lowers, the conveyor stops until need for clean filter material again causes the liquid level to rise.

Circle 141A on Reader Service Card

Controlled Air Humidity Eases Candy Making

Flexible air conditioning based on chemical dehumidification provides optimum year-round weather for each candy-making operation at James O. Welch Co., Cambridge, Mass.

Various candies require different air

Easy, inexpensive coding... for product & distribution control!

The Tickometer is the amazingly efficient counting and imprinting machine that is bringing sizeable savings to many food and drug manufacturers and processors thoughout the country.

Electrically operated, it codes, dates or otherwise imprints product labels, cartons and wrappers at speeds up to 1,000 *a minute* . . . substantially reducing the cost of this work and insuring positive identification of origins, machines, packers, inspectors, factory lots or batches, grades, special orders . . . quickly, inexpensively, unobtrusively.

The Tickometer stacks and feeds automatically, recording partial or full runs. Easy to use, requires no trained operators. Can be rented or purchased, as you prefer. Serviced from 259 service places, coast-to-coast. Ask the nearest Pitney-Bowes office for a demonstration. Or, send the coupon for a free illustrated booklet and folder of case studies.

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Equipment Applications

moisture and temperature conditions —20% R.H. at 38-40 F. for chocolate coating, 30% at 50-60 F. in the cold-process sugar-pan department.

Welch uses five humidity conditioners (Kathabar, Surface Combustion Corp., Toledo, Ohio) in conjunction with standard refrigeration to fix conditions continuously and automatically. A lithium chloride solution absorbs moisture from the air at a rate controlled by the solution's temperature.

Circle 141B on Reader Service Card

Batching Operation Sped By Electrical Weighing

Unusual instrumentation is simplifying production of liquid sugar at the Betteravia, Calif. plant of Consolidated Foods Corp.

A 2,500-gal. mixing tank and 10,000-gal. storage vessel are gaged by an electrical weighing system employing load cells and indicator-controllers (Baldwin-Lima-Hamilton Corp., Philadelphia 42). They proportion dry sugar and water, then automatically shut off ingredients flowing to the mixing tank.

Each tank stands vertically on a triangular frame of I-beams, corners of which rest on three load cells (SR-4). One instrument for both tanks totalizes the load and gives direct readings up to 30,000 lb., accurate to .1%.

Circle 142A on Reader Service Card

Nylon Wear Strips Reduce Conveyor-Operating Costs

Conveyor-line wear strips of nylon, which eliminate lubrication costs, are providing smoother equipment performance and reducing power requirements at the Peter Hand Brewery, Chicago.

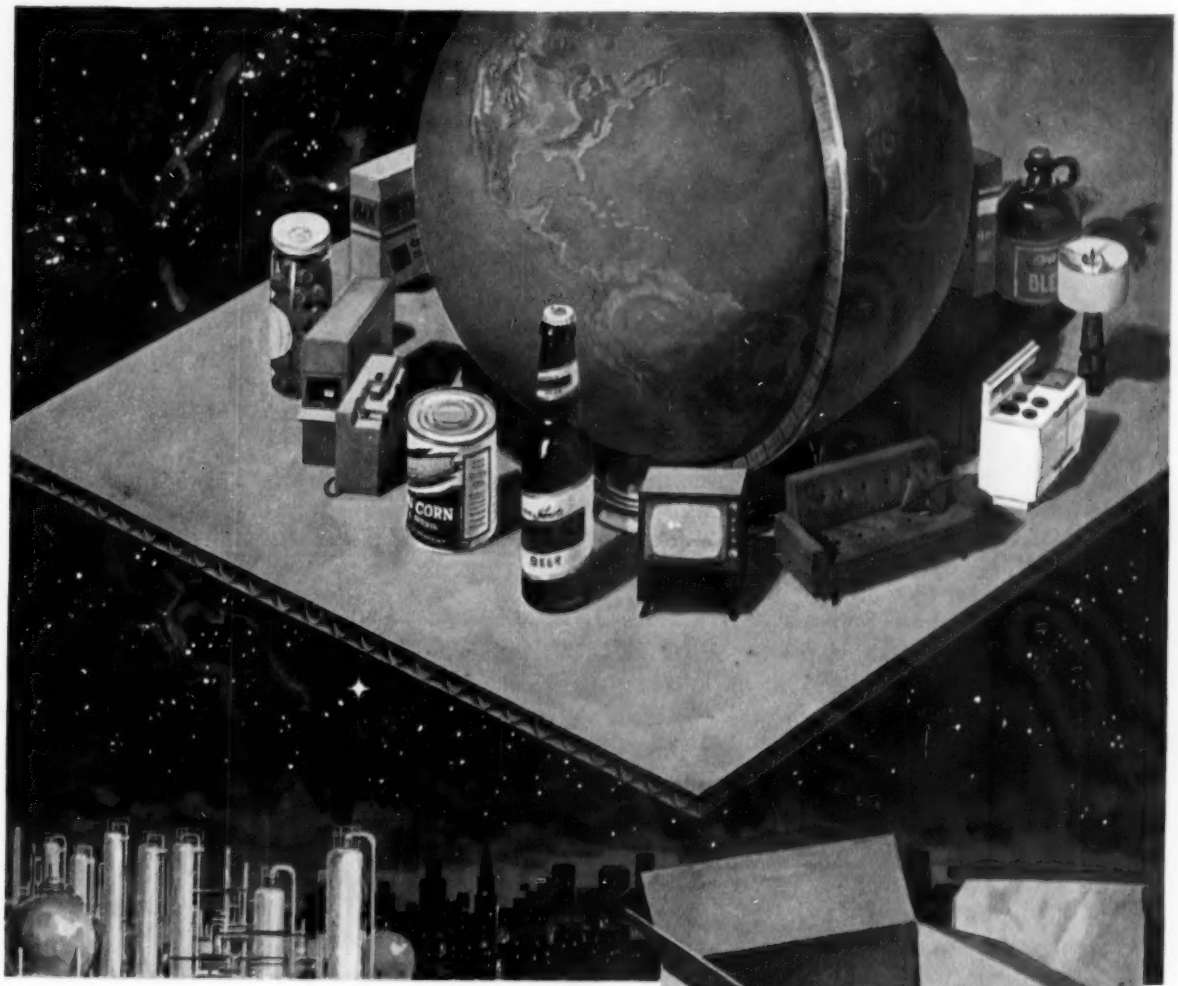
As a result, startup can be effected on a full line with no danger of spilled containers.

These strips (Nylite, Fenco, Inc., 125 N. Racine Ave., Chicago), were easily installed over existing conveyor ways. A single molded prong on each strip is pressed through a hole drilled in the way, and secured with a stainless-steel fastener.

Although originally designed for use with nylon conveyor links, units have proved equally useful with conventional metal chains. Further, they withstand steam sterilization and their sound-damping properties make for quieter operation.

Circle 142B on Reader Service Card

new horizons in **KRAFT** *packaging —*



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This new Model S-1840 ROADLINER® is economically priced in the 40,000-48,000 lbs. GCW range. And it is built to handle bigger payloads, with a high-torque engine for faster trips and fuel economy that can lead to greater savings.

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Motor Trucks • Crawler Tractors • Industrial Power • McCormick® Farm Equipment and Farmall® Tractors

Quart Beer Can

—*Continued from page 81*

limit switch is connected in series with the motor driving an endless can-feed chain above the washer.

This device was installed to prevent jam-ups of empty cans on the way to the filling machine. These can-weighted rods tip as the last can rides over them. In so doing, the micro-switch starts the motor on the washing machine's chain drive to deliver another row of cans to the filler.

Washed empties are now discharged onto a flat table-top Teflon conveyor chain for starwheel-feed into a rotary, 60-spout Meyer filling machine. Speed of the filler now operates at a capacity of 210 cans per min., but Pabst engineers hope to boost it up to 250.

Another starwheel discharges cans from the filler and also directly feeds them into a rotary, 10-head capping machine. The capper applies lithographed crown caps (underside lined with vinyl coating) which are chute-fed from a magazine.

Filled and capped quarts proceed onto another table-top Teflon conveyor chain and then to a rotary accumlating table. From here, cans are belt-conveyed to a Meyer pasteurizer.

Quart cans are conveyed through the 36-ft. pasteurizer within 23 min., passing through high-velocity water-spray zones with air spaces between all but the last two. Traversed in succession are the preheat, superheat, pasteurizing, first-cooling, second-cooling, and final-cooling stages.

Cans are discharged from the pasteurizer onto a table-top conveyor feeding a rotary accumulating table. From here, a rubber-belt conveyor transfers them onto another accumulating table. The cans then are automatically twisted (cap-end down) so that air jets blow water free from the tops of the cans.

Leaving the blowers, cans are twisted right-side up, and then conveyed to a rotary dryer. Drying the wet cans is achieved by air jets (40-60 psi.) at the machine's infeed and discharge ends. And water also is transferred from the counter-rotating cans to a felt pad around the periphery of the machine.

As cans are conveyed to the packing station, a General Electric X-ray unit monitors the fill level and pneumatically ejects underfills (F.E. June '53, p. 47).

Most of the quart cans are packed into attractive "Twin-Pak" cartons with convenient carrying handle. Flat cartons are automatically set up by a carton-forming machine. Cartons are ejected, one at a time, and fed through a pair of rubber rollers. A dozen rubber suction cups then set up each carton, into which two of the quart cans of beer are packed.

An automatic casing machine then packs four Twin-Paks and four single cans into a labor-saving zipper-type shipping case. Finally, the shipping case is machine-glued and- sealed.

End (*Resume reading on page 82*)

Over 2 Tons of Chips

—*Continued from page 70*

in at the other end of the cooker. Fresh oil is automatically pumped from a supply tank into the cooking vat. This way, oil in the cooker is kept at the same cooking level at all times.

Gas-burning equipment is of the air-suction type, with suction fan for burner located at the base of the steel stack. Safety is assured this way, since gases are exhausted to the atmosphere. Fryer vapors exhaust through ducts at feed, center, and discharge sections of enclosed unit.

A short, inclined wire-mesh belt drains excess oil from fried chips as they continue under the automatic salter. Latter unit comprises a V-shaped, 75-lb.-capacity hopper, with a pair of oscillating-type distributing bars on the bottom for uniform sprinkling of the salt over the moving chips.

Significant is the flexibility engineered into the three automatic Woodman packaging lines for putting up chips in different size bags, cartons, and tins. It is achieved by portable, wire-mesh conveyors (15 ft. long) that connect any of the six fryers with any of the three packaging lines.

Permanently installed, inclined wire-mesh conveyors cool the chips as they are transferred onto 81-ft.-long ceiling-suspended belt conveyors feeding packaging machines on each line.

Overflow chips, from each line, are either discharged into a stainless steel chute for bulk-packaging into 5-lb. tins or are belt-returned to the feed end of the overhead conveyor.

The first packaging line is equipped with six Woodman Air-Weigh machines, each turning out about 35 bags per min. These are the ¾-oz. (5¢) and 1½-oz. (10¢) sizes. Space is available to install up to four additional machines, as needed.

Second line is equipped with four Woodman Fleet-Weigh machines, with an hourly output of a thousand 25¢ bags (4¾-oz.), along with another unit that turns out about 500 of the 1-lb. bags per hour.

Third line contains four machines—two for putting out 8-oz. cartons, one for 16-oz. cartons, and another for 16-oz. tins.

End (*Resume reading on page 71*)

● Edited by GEORGE BLACK

AKH #3 NOW AVAILABLE

How to maintain close dimensional accuracy, fine interior and exterior finish and uniform soundness in the casting of a 1¼ lb. stainless steel instrument housing is told in the latest case history in the Cooper Alloy Advanced Know-How series. Ask for AKH #3 and get the full story on the use of shell mold and shell cores in the production of one of those "impossible" castings.

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Vanton's line of Buna N and natural hard rubber fittings is described in a newly revised four-page condensed catalog. Diagrams, dimensions, and application data are included. Ask for Bulletin BN.

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The demand for technical literature of value is on the increase. Our librarian reports more than 20,000 individual pieces of literature requested during the past twelve months, and we're glad to know that we are serving the needs of so many plant operating and purchasing people. For a quick glance at the most recent publications available on request, write for Technical Literature Folder TL56.

OUR FACE IS STILL RED

We're still apologizing to the many people who have requested our deluxe stainless steel valve and fitting catalog. The demand not only exceeded our supply but our ability to process them as well. Even with daily overtime and Saturday work we still haven't caught up with requests . . . so please forgive us if you're one of those on the waiting line.

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In any type of manufacturing operation—whether candy or cable . . . bread or boats . . . silk or steel—you find one universal language spoken. It's the language of *costs*—and it must be spoken fluently.

How much—in gallons, pounds, cubic feet, kilowatt hours, time—must be translated into how much in *dollars* to give you an accurate accounting of costs?

Instruments can answer the question for you, with accurate records of flow, level, downtime, weight.

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Instruments are doing an amazing job in measuring and controlling numerous process *conditions*—temperature, pressure, flow, pH, liquid level, specific gravity, and many others.

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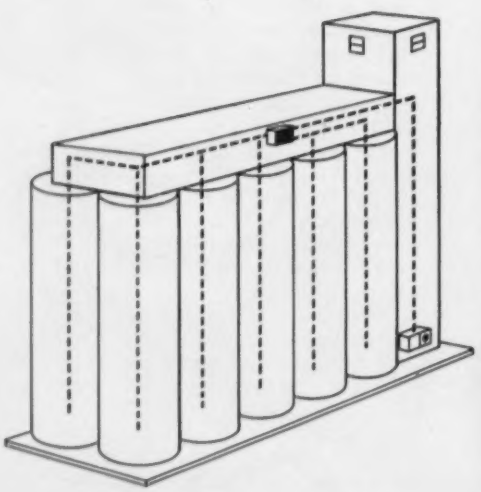
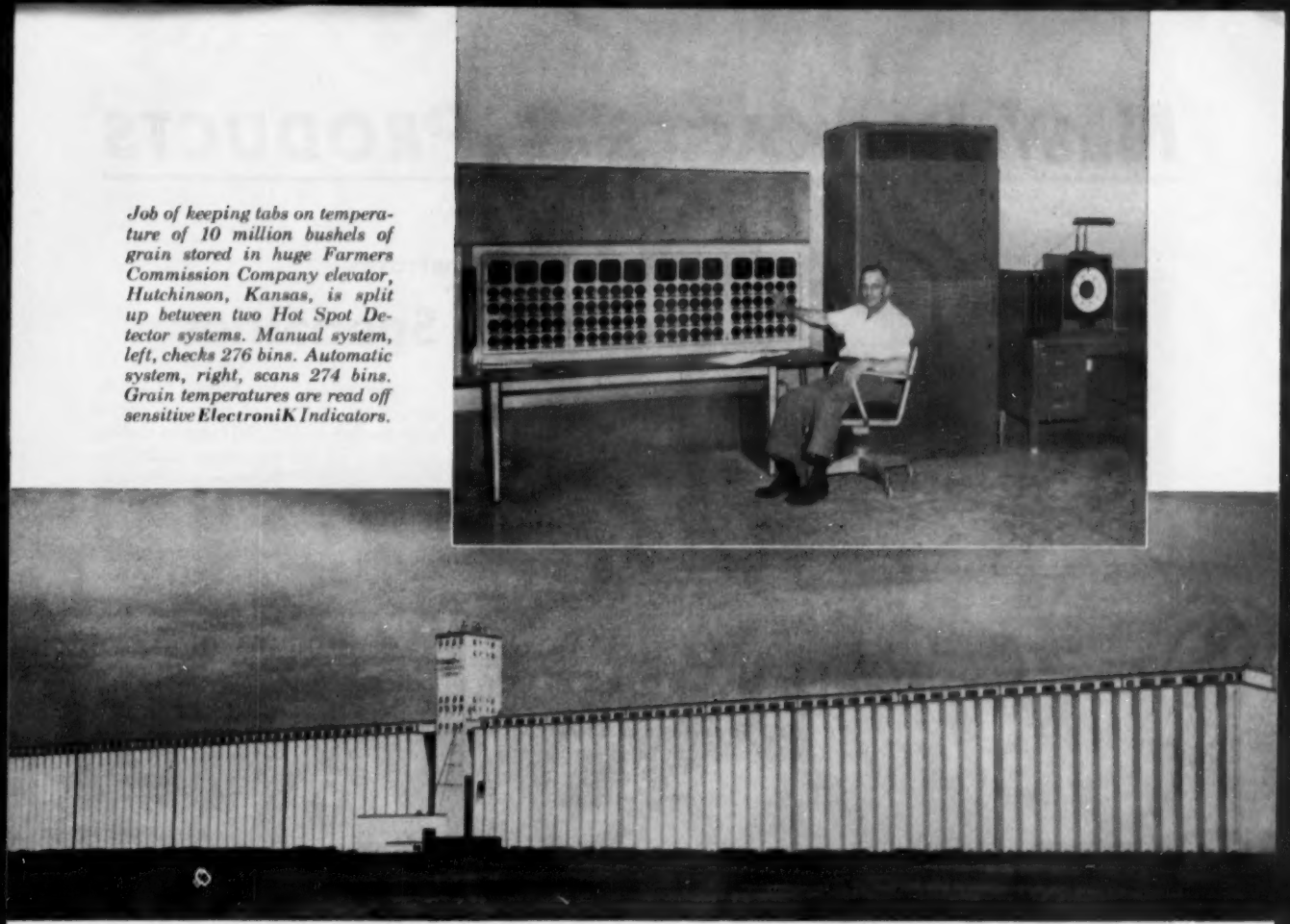
2. **Cost data related to levels of:** storage tanks, evaporators, vats, boiler drums.
3. **Cost data related to downtime of:** presses, production machinery, stills, boilers, dryers, pumps, compressors, other machines.
4. **Cost data related to weight of:** coal and other solid fuels, raw materials, intermediate products, finished products, by-products, wastes.
5. **Cost data related to the production and consumption of utilities.**

Your Honeywell sales engineer will be glad to fill you in on this important new field for instrumentation—instruments as an aid to cost accounting. Give him a call . . . he's as near as your phone.

Automatic temperature monitoring guards stored



Thermocouples spaced along suspended Nylon-covered sensing cable detect grain temperature at six-foot intervals in each of the 550 storage bins.



Job of keeping tabs on temperature of 10 million bushels of grain stored in huge Farmers Commission Company elevator, Hutchinson, Kansas, is split up between two Hot Spot Detector systems. Manual system, left, checks 276 bins. Automatic system, right, scans 274 bins. Grain temperatures are read off sensitive ElectroniK Indicators.

grain against spoilage

WHEN stored grain begins heating, it's a sure sign of trouble ahead. A rise in temperature, caused by insects, moisture pockets, dirt-chaff, or molds, signals the start of spoilage action.

With early warning of exactly when and where heat develops, however, operators can take immediate steps to protect their grain and guard against dollar loss. A dependable, foolproof system, developed and engineered by Hot Spot Detector, Inc., now senses the slightest rise in temperature anywhere in the grain and allows sufficient time to turn, fumigate, aerate, or dry the heating portions.

Heart of the Hot Spot Detector system is a sensitive *ElectroniK* Indicator which quickly signals temperature readings from thermocouples spaced at 3-, 6-, or 7-foot intervals throughout the stored grain. The Indicator, graduated from 0 to 150 F, has a big round dial which can be read as far away as 60 feet. Temperature readings are accurate to four-tenths of a degree. At various levels in every bin temperatures may be checked by means of manually switched controls . . . or scanned automatically, a thermocouple temperature report every four seconds.

In terminals, sub-terminals, country stations, and flat storage, the accurate Hot Spot Detector system protects grain against expensive spoilage, provides a valuable guide to plant operation, and reduces the cost of operating elevators. The *ElectroniK* Indicator may be installed in headhouse, gallery, or office . . . for most convenient, centralized regulation.

Here is one more outstanding example illustrating how versatile *ElectroniK* indicators, recorders, and controllers are contributing to more efficient, more automatic, and more economical operation in the food industry. Ask your nearby Honeywell sales engineer to discuss ways in which *ElectroniK* instruments can benefit you. Give him a call...he's as near as your phone.

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NEW PACKAGES & PRODUCTS

SHRIMP COCKTAIL in tumbler (top) is processed by Sau-Sea Foods Inc. Frozen baked apples by Magic Maid Foods (center) are packed two to a carton. Frozen meat tenderizer (bottom) was first introduced at AMI show by Huron Milling Co.

Frozen Food Show Demonstrates

Upsurge in Specialties

Emphasis was on specialty foods at the recent Frozen Food Exposition in New York City. Frozen cakes, baked apples, dinners, and seafood made up a large part of the products exhibited.

The frozen baked apples—two in each box—were shown by Magic Maid Foods, Inc., New York City. Cored and pared, apples are packed in individual paper serving cups. Cane sugar and corn syrup are used in processing, with no artificial coloring, preservatives, or flavoring added.

Product is reported to keep indefinitely in a freezer or ice-cube compartment, and will last for several days under normal refrigeration. One to two hours thawing is necessary at room temperature.

Frozen Cream Cakes

Whipped cream cakes in three flavors (chocolate fudge, strawberry, and banana)—were on display at the Dressel's Bakeries booth. The cakes are packaged in foil pans, ready to serve after 15 min. of thawing. The Chicago bakery uses the Frigi-Freeze label. Net weight is 1 lb. 1 oz.

Packed in an attractive premium tumbler, fresh frozen shrimp cocktail was to be seen at the Sau-Sea Foods exhibit. Each 5¼-oz. jar contains two servings of cleaned and deveined shrimp in sauce.

Age-it, a combination flavorizer and tenderizer for frozen meats, was demonstrated by Huron Milling Co. First introduced at the AMI Show in Chicago, the product is a compound containing hydrolyzed plant proteins with papain enzyme and sugar.

Reported as the first instance of a frozen chinese soup in a can, was Temple Frosted Food's chicken egg-drop and won-ton. The canned, condensed soups offer convenience to distributor and consumer.

Aquafoods Corp., Tampa, Florida, demonstrated seafood portion control with shelled oysters and cleaned shrimp packaged in foil envelopes under the Carnation label. Now in institutional distribution, the packages will soon be a retail item. Principle is similar to that used by SeaPak Corp. (FE, Oct. 1955, p. 164).

Entrees in Foil

Also using foil envelopes, is Eskimo Pie Corp. Individual servings of juices, appetizers, entrees, seafood, vegetables, and desserts are now available. Foil packages are dropped unopened into boiling water and cooked for 10-15 min. Juices and cocktails are immersed in cold water.

The envelopes guard against waste and keep cooking utensils clean. Also, the housewife can serve a different vegetable or entree to each diner.

Swanson frozen chicken a la king and pies (blueberry and peach) were on display at the Campbell Sales Co. booth. The chicken product features a lengthwise label on the can. Pies are large enough for one portion and are packed two to a carton.

Goren Packing Co. had three new meat items on display. Lamb steaks, mushroom beef steaks, and pepper beef steaks are made with the company's "whirl" freezing process.

Frozen dinners processed by Horowitz Margareten were also displayed.

Other Frozen Products

Still other recent frozen food developments:

Frozen Macaroni and Cheese is processed by Morton Frozen Foods, Inc.

Chopped Calves Liver made from liver, eggs, chicken fat, and seasoning, is being tested in the New York area by Excelsior.

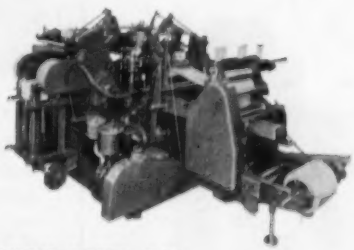
Pork Chop Suey is a new product of Chun-Wong, Inc., Los Angeles. Processor has also introduced a "No. 1 Dinner" packed in a circular aluminum tray. The tray holds mushroom chow mein, fried shrimp, and roast pork. A packet of soy sauce is included.

Breaded Veal Steakettes are packed by Pioneer Quick Frozen Foods. Two steakettes are packed in each 9-oz. carton. They are made from sliced, chopped, molded cubed veal, dipped and breaded.

Mexican Dinners are now distributed by Cuella Foods, Inc., Dallas, under the El Chico label.

PROTECTED BY RIEGEL

NEW DOMINO CONFECTIONERS' 10-X POWDERED SUGAR IS PROTECTED BY LINER OF SPECIAL RIEGEL LAMINATED OVER-WAXED GLASSINE



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Olive Selection

Three types of olives are packed in a 3-oz. package distributed by Specialty Food Packing and Importing Co., Chicago. Packed under the Pride of Spain label, jar contains ripe, plain, and sweet pepper stuffed olives. Sixteen mixed olives are in each jar.

Die-Cut Fruit Box

Designed by Hinde & Dauch, Kansas City, a bright, two-piece box is used by A. Reich & Sons, Inc., to ship and promote choice fruits.

Two-piece Prepak employs double thicknesses of corrugated board to protect the fruit on all sides. Both top and bottom of Prepak feature self-locking closure, permitting quick box assembly without stitches, glue, or staples. Both pieces are provided with die-cut hand holds.

Outside of box is printed in red and black on white liners. Inside is black printed with gold trim around die-cut holes shaped like pears, apples, bananas, and grapes. Packed unit weighs 24 to 27 lb.

Circle 150A on Reader Service Card

Angel Fluff Frosting

Latest addition to Betty Crocker line is a 7-min. angel fluff frosting mix. Distributed nationally, the mix is made at General Mills, Buffalo, N. Y. package foods plant.

Frosting is made by adding boiling water and beating. Packed in a single heat-sealed polyethylene envelope, mix comes in a 7¼-oz. carton. Each box makes enough for filling and frosting a large 2-layer cake. Frosting may be tinted for variety.

Vanilla Cup Cake Mix

Quaker Oats Company's Flako Products Div. has introduced a vanilla-flavored Flako Cuplets cup cake mix. Requiring only 2 min. beating time, each package makes 12 to 18 cup cakes or a single-layer cake. Egg and milk must be added to the product in preparation.

The company, which has produced an unflavored cup cake mix since 1933, adopted the vanilla formula after market research disclosed that over three quarters of the homemakers surveyed preferred vanilla-flavored cup cakes.

Three food plant lube problems STANOIL Industrial Oil can help you whip

big maintenance headaches can end with switch to STANOIL

1. Poor flow of lubricant on cold start-up. STANOIL Industrial Oil, due to selective refining methods which remove waxy constituents and the use of special additives, has an exceptionally low pour point. STANOIL flows freely at low temperatures, is ready to lubricate at the instant of start-up. Candy, bakery and other food processing plants with intermittent production get full lubrication of equipment from start to stop.

2. Large inventory of special purpose lubricants. Versatile STANOIL gives top lubrication performance under a broad range of conditions...heat or cold, continuous or intermittent, high pressures and low. One oil for all applications eliminates special purpose oils, eliminates inventories of these oils, eliminates application mistakes.

3. Water contamination of lubricant. Cleaning of equipment and condensation mean water contamination of most oils with resulting water-oil emulsion. STANOIL has excellent demulsibility, is specially refined to eliminate emulsion problems, contains an additive which virtually eliminates foaming.

Check with your Standard Oil industrial lubrication specialist about converting your plant to STANOIL. There is one of these Standard men near you in any of the 15 Midwest and Rocky Mountain states. Call him or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

Quick Facts About STANOIL Industrial Oil

- **Stability.** STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention.** Inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts.** STANOIL has low pour point. Flows freely from cold start. No need for costly warm ups.
- **Resists Effects of Temperature Change.** STANOIL has high viscosity index, is resistant to change in both high and low temperature service.
- **Excellent Demulsibility.** STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.

STANDARD OIL COMPANY
(Indiana)

STANDARD

use DOW CORNING

Silicone Defoamers

The most versatile and efficient foam killers ever developed, they increase your productive capacity; reduce processing time; eliminate the waste and fire hazard of boil-overs.

In the **PROCESS INDUSTRIES**, including textiles, paper, rubber and specialty chemicals, foam is killed with Dow Corning Antifoam* A Emulsion, or with Dow Corning Antifoam A Compound as a solvent dispersion or mixed with an ingredient of the foamer.

In **FOOD PROCESSING** foam is controlled with Dow Corning Antifoam AF Emulsion, permissible at concentrations up to 34 ppm or, with Dow Corning Antifoam A at concentrations up to 10 ppm.

EFFECTIVE AT LOW CONCENTRATIONS

For example, you need only:
1 oz. Antifoam A Compound in 62,500 lbs. of 70% caustic liquor.
1 oz. Antifoam AF Emulsion in 2,075 lbs. chocolate syrup.

TEST THEM FREE!

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Please send me:

☐ Booklet on Silicone Defoamers; FREE sample of ☐ Antifoam A Compound ☐ Antifoam A or ☐ AF Emulsion;

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COMPANY _____

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* T.M. REG. U.S. PAT. OFF.

MULTIPACK sleeve holds 2-6 jars. Screw-caps are lugged for quick release.

Canner Show Highlights

Among packaging ideas spotted at recent canners' convention in Atlantic City were:

Aluminum Coating and welded seams on American Can Company's new food can make container more durable. Special inner coating of enamel gives added protection. (152A)

Quick Release Cap manufactured by White Cap Co. was demonstrated on jam, ketchup, similar containers. Cap has lugs instead of threads. (152B)

Lightweight Glass containers weighing 20% less than standard jars were exhibited by Owens-Illinois. Made on a special machine developed by the company's engineers, the jars provide better distribution of thickness to get same strength as regular jars. Machine reportedly makes jars twice as fast as standard machines. (152C)

Multiple Pack was featured by Gardner Board and Carton Co. Two, three or six jars may be packed in the sturdy sleeve carton. (152D)

Edible Oils may be packaged in Crown Cork & Seal Co.'s "F" style cans. Container's stacking features aid in storing and shipping. (152E)

Circle key numbers on Reader Service Card

Consumer-Proof Wrap

A new wax overwrap for Armour & Co.'s line of flash-frozen meats recently made its debut. Designed by Raymond Loewy, wrap consists of a close-adhering cellophane inner-wrap within a cardboard carton, topped by waxed paper overwrap in six colors.

Advantage is added quality protection by the additional layer of waxed paper. New packages also hold up better through consumer handling.

Circle 152F on Reader Service Card

Printed Bag Preference

In a survey conducted in Los Angeles markets by Kwik Lok Corp., Yakima, Wash., it was noted that consumers preferred unprinted polyethylene bags over printed bags when purchasing apples. A statistical sales survey revealed a difference of 29.7% in favor of Stadelman Fruit Co. apples packaged in plain bags. The unprinted packages also sold 27.6% faster.

Pizza in Poly

Polyethylene bags are being used to package Syrian bread and Italian pizza.

Lebanon Baking Co., Detroit, packs 6 to 12 loaves of Syrian bread to a bag. Bread is reported to remain fresh for at least a week. In addition, bags have reuse value.

Poly bags are also used for a prepared pizza distributed by Luigi's Restaurant, St. Louis. Here, the reuse factor is regarded as important, because it keeps the restaurant's name before the consumer. Because of the high moisture retention properties of the film, flavor is retained for a longer period of time. Polyethylene for both packages is supplied by Bakelite.

Circle 152G on Reader Service Card

Another Bread Mix

Latest entry in the bread mix field is Duff Baking Mix Corp., Newark. Introduced in the east, mix requires only the use of a spoon and the addition of water to produce an old-fashioned type white bread.

Each package of mix is nested in an Ovenex bread pan serving as a premium. A printed tape holds the package in place.

Paperboard Bottle Box

Reported to have rigidity of wood and strength of a metal container, a corrugated paperboard, heavy-duty bottle carrier is produced by National Container Corporation. Made of waterproof, high-test VC, a sturdy paperboard, carrier was designed in supplier's Research Department.

The patented carrier has an interlocking bottom of double thickness board. Ends are triple thick and side walls double thickness bored. Hand grips are cut in both ends. A heavy steel wire reinforcing is folded into the top edge of the carrier. Carrier is delivered flat with a single metal stapled seam.

Circle 153A on Reader Service Card

Canned Corn Bread

Packed in a 16 oz. can, Southern style corn bread is being distributed by Vacuum Baking Corp., New York. The ready-to-eat product contains wheat flour, cane sugar, vegetable shortening, whole eggs, non-fat milk solids, corn meal, salt, baking powder and vanilla.

Product is baked in a can with lid on, then vacuum sealed to preserve freshness and flavor. No refrigeration is required, though heating is recommended to bring out the flavor.

Can is a No. 2½, manufactured by American Can Co.

Circle 153B on Reader Service Card

Bacon-Cut Pastrami

Reported as the first instance of a prepackaged pastrami being cut and packaged on a standard bacon line, is New England Provision Co.'s operation at Boston.

Choice and prime ribs of beef are boned and cured. After smoking the meat is chilled at 28-30 deg. F. for 8-10 hrs. When firm enough, beef is

FOR ROUND CAN CLOSING REQUIREMENTS

YOU HAVE EVERY REASON TO SPECIFY

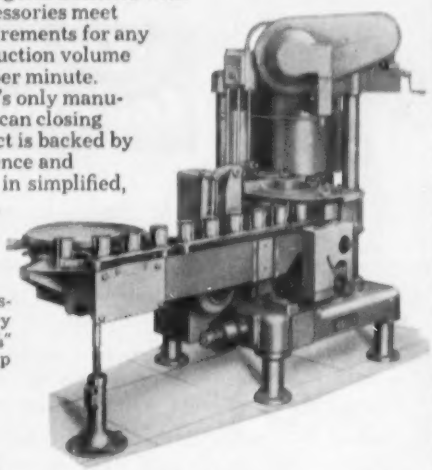
ANGELUS

• *Lower Initial Cost* • *Less Maintenance*

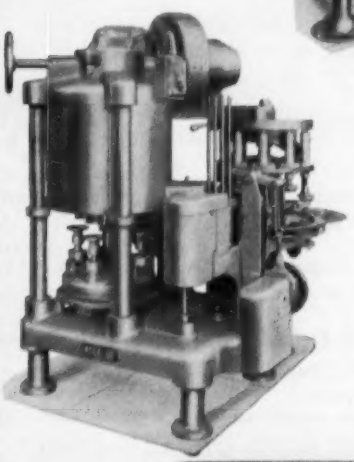
• *Greater Production Efficiency* • *More Versatility*

These are the reasons more canners and can manufacturers throughout the world are switching to Angelus Automatic Seamers. The complete line of Angelus Seamers with their wide range of accessories meet round can closing requirements for any type of product in production volume from 30 up to 500 cans per minute.

Angelus is the nation's only manufacturer specializing in can closing machines. Every product is backed by over 40 years of experience and represents the ultimate in simplified, rugged, efficient design.



MODEL 40P—MSLF
With chain feed for can closing only. Automatic Rotary Seamer for round cans 2⅛" to 4¼" in diameter and up to 275 cans per minute.



MODEL 40P-DF
For can closing and can making. Automatic Rotary Seamer with disc feed for round cans 2⅛" to 4¼" in diameter and up to 275 cans per minute.

Investigate the advantages of low cost production, low cost investment, and low cost maintenance with Angelus Automatic Seamers.

Write today for complete details on models and an Angelus Engineered Application Recommendation.

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Every demonstration proves the value of these 5 FEATURES of the NEW Ve-Be-Veyor

The conveyor with the belt that Can't Run Off Center

Feature 1. New "in the groove" design keeps belt running straight. This eliminates belt wearing and fraying at the edges. No difficult and time-consuming adjustments.

Feature 2. Aluminum construction saves weight—makes it really portable. Channels are flanged for extra strength. 12 foot unit weighs only 149 pounds. Available also in 16 and 20 foot lengths.

Feature 3. No pulley adjustment needed. Take-up of belt as it stretches is as simple as shifting gears in your automobile. No tools or "know-how" required.

Feature 4. Handles heavy loads at inclines up to 30°. Users report the Ve-Be-Veyor will take loads heavier than its own weight, hour after hour, with no trouble.

Feature 5. Plugs in any lighting outlet. Can be used any place where you have a lighting outlet. No special wiring is required.

FIND OUT FOR YOURSELF . . . Send for Bulletin 600. Or better yet, ask us for a demonstration, without obligation, of course.

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☐ Please arrange for a demonstration of the new Farquhar VE-BE-VEYOR.

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OLIVER Farquhar CONVEYORS

POWER BELT AND GRAVITY CONVEYORS

cut and packaged on an Albright-Nell bacon slicer line. A high percentage of waste realized during the cutting operation is collected and sold as lower grade pastromi.

Circle 153C on Reader Service Card

New Protein Bread

Developed by the Wisconsin Alumni Research Foundation, Madison, a light bread containing a new concentrate of complete protein is being introduced in the South Bend, Indiana area. Called V-10 Protein, it offers a very high complete protein value, with low fat content.

First producer of the new bread is Kremo Bakeries of South Bend. No exclusive marketing arrangements are in effect, however, according to Foundation officials. New development is available to all bakers regardless of size or location. Concentrate is manufactured by Special Foods Company of Red Wing, Minnesota.

The name is derived from fact that concentrate has 10 essential amino acids. Efficiency of V-10 is reported to be equivalent to that of animal protein.

Circle 154A on Reader Service Card

New Product Shorts

Strained Egg Yolks packed in glass jars are newest Heinz baby food product.

Rubber Ring for apple cider, salad oil, etc. has been developed by Crown Cork & Seal Co., Baltimore. Treated with silicone, cap liner is oil-resistant.

Spaghetti Sauce Mix containing 18 different ingredients is processed by Spatini Co.

New Mustard uses imported Moselle wine in combination with apple-cider vinegar instead of distilled vinegar. Made by Olds Products Co., Chicago, mustard is made from stronger brown mustard seed.

Consumers may now obtain Golden Dipt batter mix, formerly available only in institutional sizes.

Frozen Chocolate Cakes processed by Sara Lee, Inc., will be distributed first in the New York City area. The cake is the fourth in the baker's line.

—End—

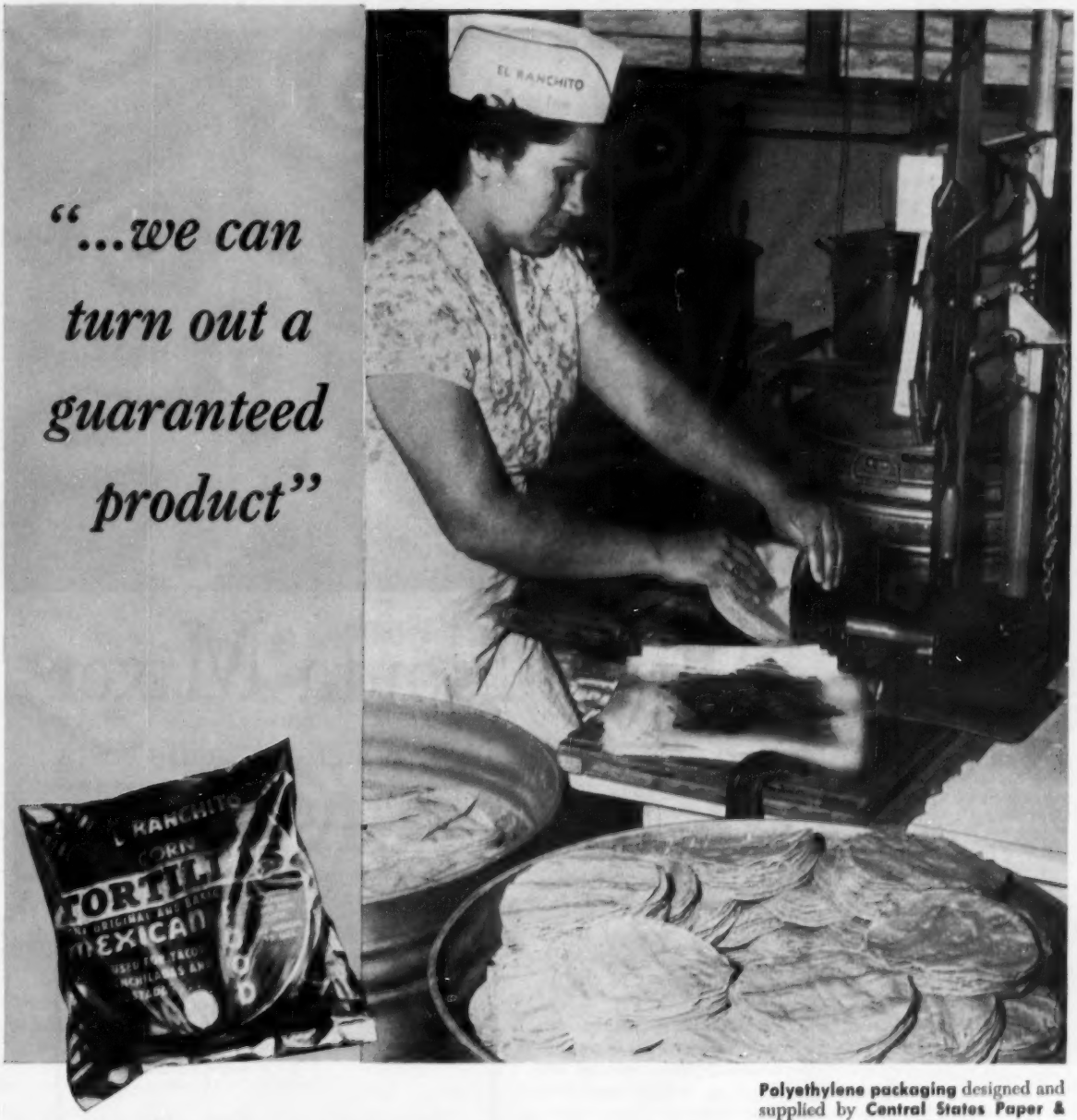
Treating Your Water

—Continued from page 86

the multiport valve from one position to the next and leaving it in there for the required length of time. Operation can be made completely automatic, the regeneration process being initiated by a contact on the water meter.

When capacity of the unit has

"...we can turn out a guaranteed product"



Polyethylene packaging designed and supplied by **Central States Paper & Bag Co.**, St. Louis, Mo.

"There is no question, of course, that film made of BAKELITE Polyethylene has upped our sales considerably," declares T. W. Clark, president, El Ranchito, Zillah, Washington.

"Keeping the proper moisture content of tortillas is vital to keeping them flavorful. This is just what the polyethylene bags do. The groceryman likes them because he doesn't have to worry about the freshness. In that way we can be sure that *we have a guaranteed product.*"

Whether you market tortillas or practically any other processed or fresh foods, packaging can be the key to freshness and bigger sales. You can help assure a "guaranteed" product if you contact your local packaging supplier today for all the details on packaging in film made of BAKELITE Brand Polyethylene.

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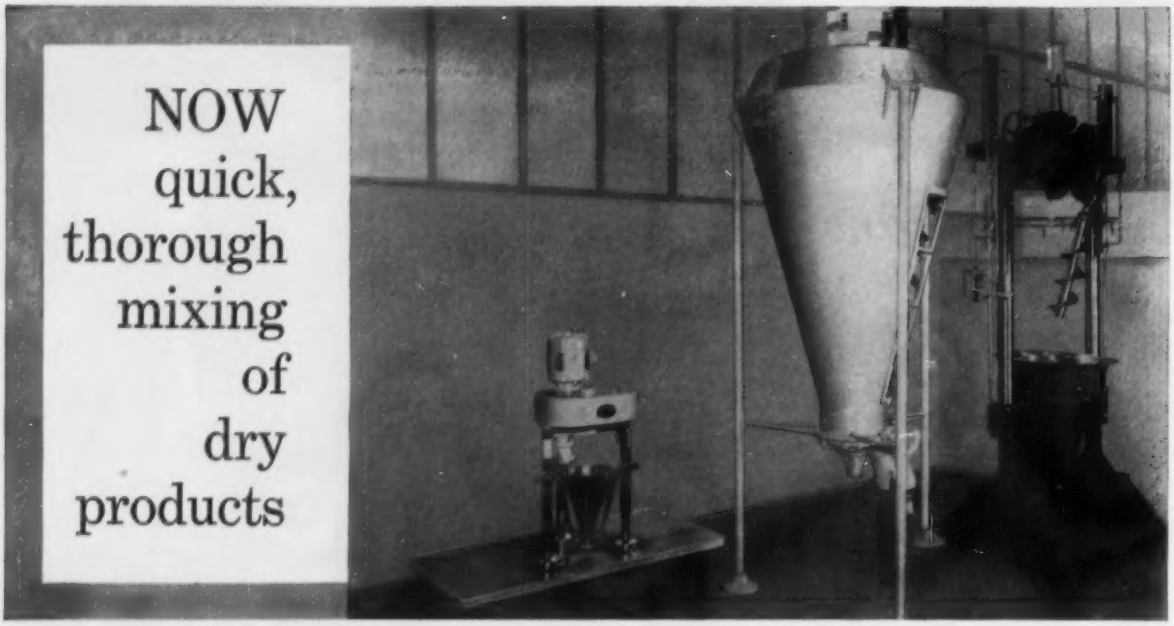
For more data, circle this page number on card at back →



with the NEW Nauta Mixer

Precessional motion of Nauta speeds production... cuts costs

Uniform, *quick* mixing of any number of dry materials in any proportions . . . wetting dry materials with small quantities of liquid . . . or dissolving solids in a liquid media . . . these are the exclusive features of the *new* Nauta Mixer. The gentle, yet positive action of the precessional motion of the Nauta intimately mixes products in any proportion . . . without dusting or change in their original characteristics.

By shortening time cycles required for thorough mixing, the Nauta Mixer increases production. The revolutionary precessional motion means less power consumption. This is a combination that results in substantially lower costs.

Why not try the *new* Nauta Mixer in your operations? We will gladly send complete information on request.

Let us Pretest your product

A quantity of your product ingredients can be mixed under actual production conditions in a Nauta Mixer now in the Buflovak Research Laboratory and Testing Plant, with positive results. Let us tell you about this service.

ASK FOR BULLETIN NO. 374

For profitable use in many industries

The advantages of Nauta Mixers can be enjoyed wherever dry materials require thorough mixing.

Agricultural products	Meat
Ceramic materials	Metal powders
Chemicals	Paint pigments
Cosmetics	Pharmaceuticals
Dissolving viscose rayon	Resins and plastics
Fertilizers	Seeds
Fish meal	Sizing compounds
Flour	Starch
Food products	Sugar
Insecticides	Many other products
Latex mixed with chemicals	

The Buflovak Equipment Division of Blaw-Knox Company is the exclusive licensee for the Nauta Mixer. It is built to the same exacting standards for which Buflovak is famous in building evaporators, dryers, autoclaves, kettles and other equipment.

BLAW-KNOX

BLAW-KNOX COMPANY

Buflovak Equipment Division, 1637 Fillmore Avenue, Buffalo 11, N.Y.

been reached, as indicated by the meter, the automatic valve operates, completely regenerating the softener and putting it back into service without any attention whatsoever.

Proper water-treating equipment is an absolute essential in the soft-drink field. From the standpoint of cost per bottle of product—comparing this with the advantages gained by the use of proper water treatment—it is one of the greatest bargains available today.

End (Resume reading on page 89)

Accidents Cut in Half

—Continued from page 48

stant study of the new departmental activities. The more interesting ideas were reported to the weekly supervisory management meetings. Here's evidence of the results: The company now holds regular monthly conferences between executives and union stewards. Since activation of the new program, the major subjects of discussion initiated by the stewards have been matters of safety.

Also, since the change in the approach to accident prevention, more care is given to safety instruction of newly hired employees. And to tighten up on lost-time abuses, a panel of four doctors has been selected.

Interviews with these doctors served to establish a cooperative basis for minimizing the amount of lost time following minor injuries. Closer accident follow-up was also obtained.

Interest Stimulators

Exchange Lemon Products Co. has believed in and practiced what it considers good, long-range organizational procedures, and so it has tended to shun the "flashy gimmick" type of safety promotion.

Even so, it has recognized the value of a modicum of quick interest stimulators where they are most applicable—when interest tends to slacken.

One such method, which appears to have become thoroughly established, is the flying of the green-cross safety flag immediately below the American flag on the pole in front of the plant. On the days—now rare—when a lost-time accident occurs, this flag is flown at half mast. Everyone is watchful, and there is a determined spirit among the workers to keep the flag flying high.

In addition to the $55,000 insurance-premium refunds of 1954-1955, results have otherwise been strikingly encouraging.

During the final quarter of 1953, right after the "send-off" meeting, enough improvement was made to reduce the annual rate 25% below the preceding year—bringing the lowest figure in four years.

Latest Frequency Figures

Then results in 1954 showed an additional 42% improvement. The 21.3 frequency rate established for that year was below the national average, which itself had been improving markedly. It is gratifying also that results for 1955 portray a continued downward frequency trend, with the final figure approximately 25% below the previous year.

► True, factors affecting accident experience are never stationary—and disagreement and debate regarding proper methods may always be expected.

Nevertheless, there is no doubt in this case that an eye-opening, clear-cut definition and fixing of responsibility did result in a continued lowering of accident frequency and a vital improvement in plant safety for Exchange Lemon Products Co.

End (Resume reading on page 49)

European Tubed Foods

—Continued from page 61

is short. This permits synchronization of the sterilizing process with packaging operations so that production may be made continuous and automatic.

Recent researches have indicated that foods in tubes also are adaptable to sterilization by radiation.

In Europe, the cost of tubes for food is most nearly comparable with glass packing in containers of similar size. Such small size glass containers are seldom used for food in the United States.

The one food packed here in large volume in small glass jars, is baby food. However, even this product is packed in 5 to 8 oz. containers, while many of the European specialty foods are in metal tubes packed in sizes from 2 to 4 oz.

The food industry here does use cans in smaller sizes, ranging from 4 oz. to 7 oz., for mushrooms and pimentos. The price range of small jars and small cans is 2½ to 3½ c. Tube costs vary from 3½ to 5 c. apiece, but there are savings in label and cap costs.

Space and Labor Cost

Space requirements of the European type of tube-filling machines are small (2 ft. x 4 ft.). Only one machine attendant is required. Machine maintenance is minor and clean-up requires minimum time and labor.

End (Resume reading on page 62)

4½" DIAL THERMOMETERS

Made in 3 types to suit any requirements. Rigid stem, wall or flush mounted, 11 inches of scale reading. Interchangeable with standard industrial separable sockets. Stem can be placed at any angle and case can be rotated to any readable position.

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Temperature Indicating Instruments

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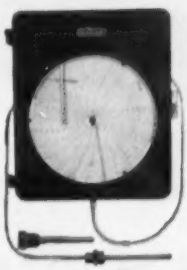

Twelve inch die-cast aluminum case with black or white wrinkle or satin finish. Single or multiple pen construction. Electric or spring wound clock, 24 hour or 7 Day Revolution. Flexible Armor and bulb of stainless steel. Ranges —40 +950°F or Equivalent in °C.

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Red-Reading Mercury —Extruded brass case — chrome finish. Ranges —40 + 950°F or Equivalent in °C.

RED-READING MERCURY LABORATORY THERMOMETERS

Thoroughly annealed for permanent accuracy. Complete line A.S.T.M. and fractional division types.

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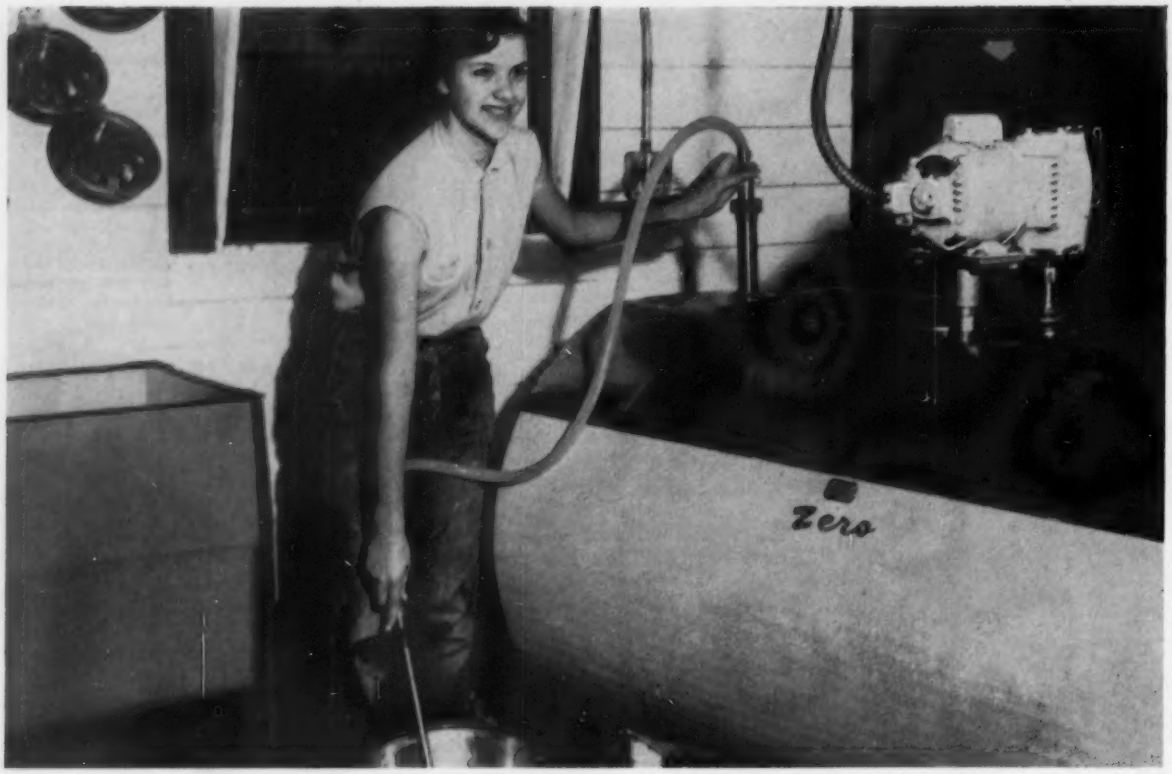
THERMOMETERS, INC.



To guard against oil contamination on a shaft-down agitator application

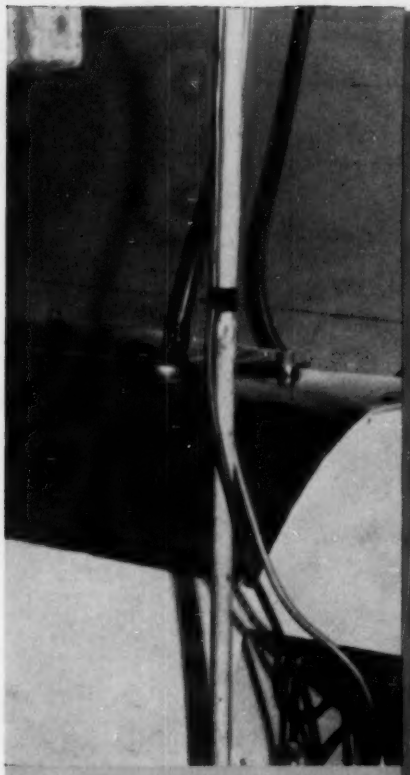
NEW MILK COOLERS DEPEND ON Century Performance-Rated® GEARMOTORS

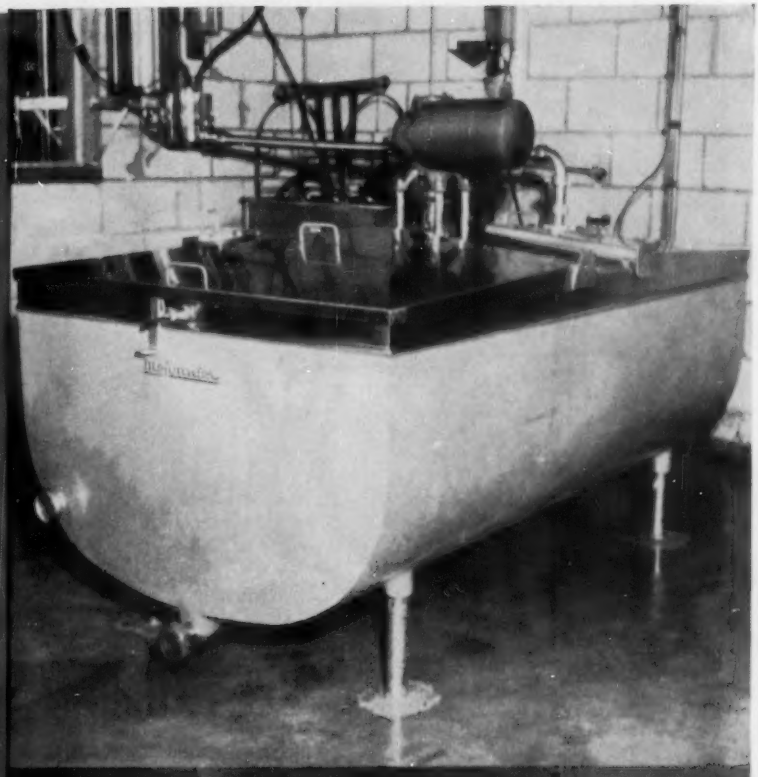
Century Performance-Rated Gearmotors are playing an important part in making possible this new era in milk handling. Slow agitation is important to chill the milk quickly and evenly in the cooler. Ordinary agitator motors mounted shaft-down, dripped oil into the milk. Century's unusually reliable standard shaft seal has virtually eliminated this problem.

Furthermore, a motor must be "washable" if it is to be used in the sanitary milkhouse. Century can supply a pedestal-mounted gearmotor with a specially designed smooth-contour cover. This cover eliminates most crevices in which dirt could collect, and it protects the motor from moisture . . . even when it's washed down.

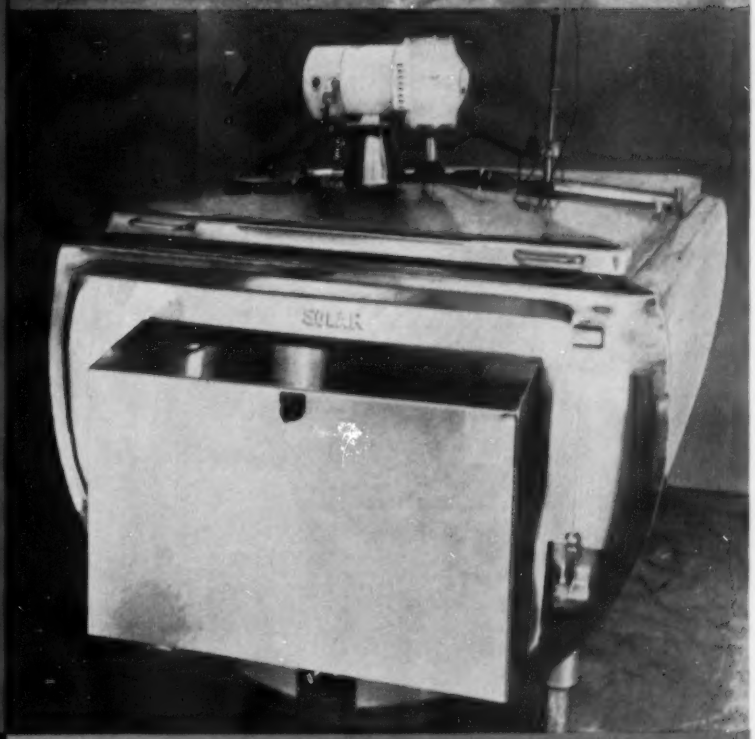
Could your processing operation be improved by Century Motors, Performance-Rated to give you the correct speed, protection and freedom from contamination? We will be happy to discuss your problems with you.

For full data call your nearest Century Sales Office or Authorized Distributor.





NEW PROFIT AND EFFICIENCY in milk handling is made possible for even small and medium-sized dairymen using these ingenious new bulk milk coolers. By drawing the fresh milk directly into the cooling tank for storage, bacteria counts are kept at a minimum, butterfat content is preserved. Leading manufacturers of these popular new milk coolers equip them with Century Gearmotors.



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ADVANCES IN TECHNOLOGY

Protective Packaging

Wrapping materials that protect oleaginous foods such as butter and margarine from contamination by mold during handling and storage are objects of a recent patent.

Preferred materials are parchment wrappers and stiff, paperboard cartons, each coated with 140-150 F. mp. waxes containing 1-2% fungistatic acid such as benzoic or sorbic.

When parchment is used, coating is applied to only one side. And in wrapping food with it, said coating is to be on the exterior surface. In case of cartons, fungistatic coating is applied to both sides.—U. S. Patent 2,724,650, Nov. 22, 1955.

Making Smoke Flavor

Entrapping and recovering the flavorsome ingredients of smoke from vegetable matter is the basis of a patented process for making a condiment which, when applied to food products, will impart a smoky flavor.

Recovery is accomplished by electrostatic precipitation, condensation on cold surfaces, or entrapping products of combustion in a mist of flavorless oil and precipitating the mist.

Regardless of method employed, they are mixed with a suitable carrier or other condiments to produce a paste or sauce.—U. S. Patent 2,722,482, Nov. 1, 1955.

New Dehydrating Method

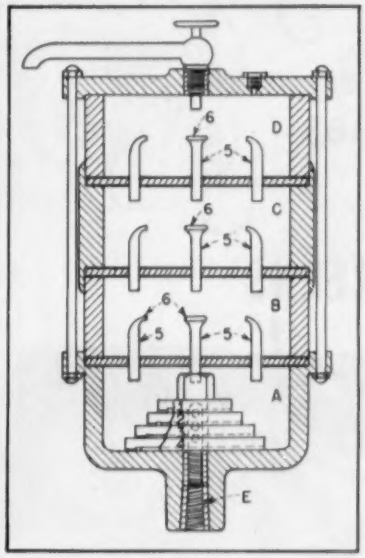
In a patented process for preserving cooked food by dehydration, novel step consists of mixing some of the food with particles of the same food which have been previously dehydrated, preferably in alternate layers.

Previously cooked and dried product will provide adequate channels for passage of steam through mass during cooking process and for passage of drying air during subsequent dehydrating operation.

In practice, food is washed and subjected to the action of a stabilizer and buffer, such as SO_2, benzoic, or salicylic acid. If the food is large it may be sliced or otherwise reduced in size to facilitate dehydration.

Cooking may be done by steam, hot air, dielectric or other form of heating which will not add a substantial amount of water. During cooking the previously dehydrated product will absorb flavors and juices from the uncooked portion. Mass may be dehydrated immediately after cooking, or it may first be frozen to enable the soft food to withstand handling.—U. S. Patent 2,723,202, Nov. 8, 1955.

Simpler Carbonator—No Moving Parts



Intimate mixing of a liquid and a gas without use of mechanical stirrers is the object of a recently patented invention.

Required turbulence for proper mixing is created by the manner in which the gas and liquid are introduced into, and moved through the several components of the unit.

Device consists of a large container comprised of four mixing chambers (A, B, C, D, in accompanying drawing).

In chamber (A) there is a tangential inlet for water, equipped with a nozzle or spray that breaks the liquid into fine particles as it enters. It also has two diametrically opposed vertical baffles that further agitate entering liquid.

In base of chamber (A) are four different size circular diffusing plates (1, 2, 3, 4). These have undercut portions (broken lines) leaving narrow flanges at the peripheries in which are cut 2/1,000 to 5/1,000 in. deep grooves. As the plates are stacked coaxially, flat circular chambers are formed connected to primary chamber (A) by means of the above mentioned grooves.

Gas is supplied to the small chambers from an opening in center shaft (broken lines) which connects with gas inlet (E).

Plates separating chambers (A, B, C, D) are pierced by a number of vertical tubes (5), upper ends of which are bent toward center of chambers and pinched to narrow openings (6). Top compartment is equipped with pressure relief valve, and a manually controlled faucet through which carbonated liquid may be fed to processing.

In operation of the device, gas and liquid are introduced into chamber (A) through previously described inlets and intimately mixed. Mixture is then forced upward through tubes (5) and further mixed as it discharges through the narrow openings into chamber (B). Additional turbulence is created by the fact that all tubes discharge toward center of chamber.

Similarly, mixture moves through chambers (C) and (D) where carbonation is increased. Where desired, additional chambers can be incorporated to further increase the carbonization.—U. S. Patent 2,721,064, Oct. 18, 1955.

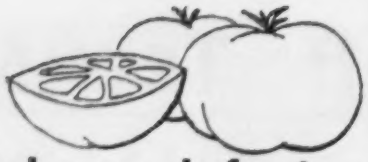
Irradiation Before Heating Cuts Sterilizing Time

Preliminary treatment by irradiation lowers resistance of some bacterial spores to heat sterilization. This is true of 2 strains of *Clostridium botulinum* (62A and 213B) which were irradiated with gamma rays from cobalt-60.

But preliminary heat shocking at 210 F. did not affect the lethal action of subsequent gamma ray irradiation.

When spores of *C. botulinum* 213B were irradiated with 900,000 rep of gamma rays, the F_o value was reduced from 1.48 to 0.46. Taking the irradiation effect into account, the final F_o value was 0.35, approximately a 4-fold reduction. Spores were less affected in gelatin or nutrient broth than they were in a phosphate buffer. —*Applied Microbiology*, 346-52, 1955.

JUICE



without specks or defects

Even from badly cracked tomatoes with these SIMPLICITY SCREENS

FRANCIS C. STOKES COMPANY, one of the country's largest tomato seed producers, reported that the installation of FIVE SIMPLICITY TOMATO SCREENS resulted in a marked improvement in their operation, quality-wise. They found that even when handling badly cracked tomatoes, they obtained juice which was relatively free from black specks, or defects. The screen's operation resulted in quite a saving on trimming labor.

Simplicity Double-Deck Screens are specifically designed for better seed removal. Stokes reported excellent germination of the tomato seed removed.

Simplicity Screens improve tomato processing because their efficient balanced gyrating action and larger screening area provide as much as 50% more handling capacity. A richer tomato product results when all the juices and pectin are scrubbed from the skins by the action of the screen.

Simplicity all stainless steel construction and removable trays cut cleaning time to a minimum. Check with your Simplicity representative today!

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Automatic Fumigator

Designed particularly for use on enclosed screw conveyors, a patented invention offers means for automatically fumigating the equipment.

Device is useful in brewing and other industries where large amounts of grain are transported from storage bins to place of use by means of screws. Such apparatus must be fumigated from time to time in order to guard against infestation by insects.

Fumigator consists of an open-ended cylinder attached to the upper wall of an enclosed conveyor, and communicating with the interior through an opening in the wall. Within the cylinder, and eccentrically attached to it, is a smaller cylindrical container for a volatile fumigant. Folded over the inner and outer walls of the container is a wick which dips into the fumigant, offering a large absorption surface to the liquid and presenting a large evaporation surface to the air. When the conveyor is sealed off and the cylinders capped, the fumigant fills the conveyor.—U. S. Patent 2,722,452, Nov. 1, 1955.

High pH, Low Temperature Cut Cl Efficiency

Alkalinity of water and its temperature both influence the bactericidal effectiveness of Cl. These factors are of particular significance to makers of cottage cheese who find it necessary to chlorinate wash water in order to destroy bacteria associated with formation of gelatinous curd.

It was found that 3 ppm. residual Cl destroyed *P. fragi*, *P. viscosa*, *A. metalcaligenes*, *E. coli*, and *A. aerogenes* in ½ to 0.8 min. at pH 6. At pH 8, as long as 2.2 min. were required, and at pH 10, *P. fragi* needed 12 min. exposure. Increasing Cl to 5 ppm. more than halved the time.

In the case of temperature, it took approximately twice as long to destroy *P. fragi* (found most resistant of cultures tried) at 40 F. as it did at 70 F. —10-14 min. vs. 4-8 min. with 3 ppm. residual Cl.—*Journal of Milk & Food Technology*, 189-91, Aug. 1955.

Silverizing Ineffective For Beverage Water

Sterilization of water supplies by application of the oligodynamic action of metals has frequently been advocated, and inability of many bacteria, including water-borne pathogenic types, to survive in such water has often been demonstrated.

Whether the ions of Ag, the metal most often used, would be equally

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Improving flavors for tasty baked goods or soft drinks, even orange ice—these are all tasks regularly assigned to Dow propylene glycol, U.S.P.

This highly effective solvent has become an accepted standard for flavors, extracts and flavor concentrates. Many makers of food colors, too, have replaced other solvents with propylene glycol—with remarkable savings and only minor changes in formulation.

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how TITANIUM

can tame the corrosive pickle...

Processors of pickles, catsup, or other foods with a high chloride content, know how quickly they attack kettles and other equipment of ordinary metals. Corrosion causes frequent replacements and troublesome shutdowns.

Titanium can be the remedy. For REM-CRU titanium is unaffected by chlorides and most organic products. It is completely impervious to salt water or brines which normally cause pitting in other corrosion-resistant structural metals.

What's more, titanium can not contaminate food products . . . adds no unwanted 'metal-taste.' And titanium's light weight—it's as strong as steel, but 40% lighter—makes equipment easier to handle.

REM-CRU titanium is now available for *prompt* delivery in most sizes and types. Why not let a REM-CRU engineer help you decide how to put this versatile metal to best use in your plant?

To keep abreast of the latest developments on this vital metal, write to Dept. F-3 for the Rem-Cru Review—a free periodical presenting the latest technical data on titanium alloys.

REM-CRU TITANIUM

REM-CRU TITANIUM, INC., MIDLAND, PENNSYLVANIA

bactericidal when silverized waters were used for preparation of foods and beverages has not been settled. Presence of proteins and ions that will combine with Ag is presumed to render it inactive.

Because soft drinks prepared with silverized water developed cloudiness, color changes, and fermentations, a systematic study was made on effect of 5 different preparations, each at 2 concentration levels in 4 media against 6 bacteria, 8 yeasts, and 1 mold. Both synthetic and natural media (orange juice) were used. Some organisms grew in the presence of silver in all media, and yeasts were scarcely affected.

When the organisms were left in silverized water for 48 hr., then transferred to suitable nutrient media, only one (*Pseudomonas lindneri*) failed to grow. It is concluded that silverizing treatments are not effective against industrial spoilage organisms.—*Wissenschaftliche Beilage für Brauerei*, 95-97, Aug. 1955.

Controlling Microorganisms In Yeast Fermentations

Sorbic acid has been proposed for control of bloater-forming yeasts in cucumber fermentations.

At pH 5 and below, it was found to inhibit these yeasts very effectively. At pH 4.6, all yeast in a salt-free medium were inhibited by 0.04% sorbic; 0.02% was effective in 4% salt broth, and 0.01% in 8% salt.

Since no viable cells were found after 7 days contact with sorbic acid, this compound is somewhat fungicidal as well as fungistatic. The three species of lactic acid bacteria tested were not greatly affected by the sorbic acid, irrespective of the pH of the medium, but they did not utilize it.—*Applied Microbiology*, 341-45, 1955.

Fumigation of Wheat

Mercury vapor has a very high toxicity for insect eggs at extremely low concentrations, but its value as an ovicide for fumigation of cereals may have certain limitations because it combines rather strongly with wheat tissues.

Concentration of Hg vapor in air can be measured by its effect on the sensitivity of a photoelectric cell to ultra-violet light. Such an apparatus can detect 10^{-10} g. of Hg in 50 ml. of air.

Pyrex glass vessels do not appear to absorb it, but wheat exposed to an atmosphere containing 6.0 mg. Hg/cu. m. absorbed varying amounts,

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6¢ worth of detergent to clean this truck

. . . says dairy using Oakite Foam Spray Unit

Recently, a North Carolina dairy decided to go modern in its truck-cleaning operation. It switched from the old bucket-and-brush method to Oakite Foam Spray cleaning, with Oakite Composition No. 70 as detergent. Here is what this dairy reports:

CLEANING TIME CUT Start to finish, it takes on the average only fifteen minutes to bring a soiled truck to sparkling clean condition.

DETERGENT COST CUT Using an 8 oz/gal solution, cost of O.C. 70 is less than 6¢ per truck. Reason: powerful O.C. 70, sprayed on as a lather by Oakite's Foam Unit, clings like a leech to sides of truck. Every tiny bubble works full time loosening road film and truck soils. No wastage by drip to ground, no wastage between brush and bucket.

And best of all, reports this dairy, trucks come through the fast, low-cost wash looking better than ever! And with a minimum of brushing.

Your local Oakite Service man will show you how to do a faster, better fleet-washing job at less cost. Call him. Or, for more information on modern truck cleaning methods, write for Booklet F9254 to Oakite Products, Inc., 26G Rector St., New York 6, N. Y.

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depending on moisture content of wheat and temperature.

Most of it is chemically combined with the wheat but some can be recovered by aeration. After exposure for 2 yr. to an atmosphere saturated with Hg vapor, 5.8 mg. Hg/100g. of wheat was more or less irreversibly combined with the tissues of the grain.

Dispersion of vapor through a mass of wheat for 8 days produced a mercury concentration of 5 mg./cu. m. at a distance of 30 cm. from the source, and 0.25 mg./cu. m. 90 cm. from the source.

For effective ovicidal control no part of the wheat mass should be more than 2 ft. from a source of Hg vapor. In spite of its toxicity to man, there seems to be little likelihood of dangerous concentrations in grain storage, and the combination of Hg with wheat appears to be in the form of insoluble and unmetabolizable sulfur compounds.—*Journal of the Science of Food & Agr.*, 791-99, 1955.

Frozen Fish Sticks

A process for making a precooked fish food is disclosed in a recent patent. Object is to deliver to the housewife partly cooked fish sticks that require a minimum of heating to be ready for serving.

The process involves freezing fish fillets in slabs which can be cut into sticks weighing about 1 oz. each. Sticks are then treated with egg batter and breading material, and fried by complete immersion in oil at 370-375 F. for 75-85 sec.

Precooked sticks are allowed to cool below 100 F., packed in a container holding 10 sticks weighing about 10 oz. and frozen to zero F. within 3 hr. Consumer can complete preparation by placing in an oven at 425 F. for 12-15 min.—U. S. Patent 2,724,651, Nov. 22, 1955.

Recycling Dry Peanut Meal Improves Oil Recovery

Addition of a portion of solvent-extracted and dried peanut meal to raw peanut flakes, substantially increases rate of extraction and minimizes effect of excessive fines and the method should be applicable to other oilseeds.

This recycling method eliminates the costly steps of prepressing cooking, resizing, and reforming. When applied to filtration-extraction of raw peanuts, data showed that it increased mass velocity during filtration from 112 to 2,860 lb./sq. ft./hr., yielding

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(Acetyl Triethyl Citrate)

The Food and Drug Administration has now accepted CITROFLEX A-2 for use in plastic food wraps—like the cellulose acetate food packages you see here. Non-toxic and odorless, CITROFLEX A-2 is accepted *for both fatty and non-fatty foods.* Most important to you, the cost of this citric acid ester is remarkably low, compared to other nontoxic cellulose acetate plasticizers.

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(Acetyl Tributyl Citrate)

CITROFLEX A-4 is also nontoxic, odorless and accepted by the F.&D.A. for use in plastic packaging of *either fatty or non-fatty foods.* You can use CITROFLEX A-4 to plasticize vinyl films for meat wrapping...vinyl coatings for food containers...vinyl plastisols for bottle crown liners, food jar sealing rings and "safe teething" vinyl toys. Compare the cost of efficient CITROFLEX A-4 with other *F.&D.A. accepted* vinyl plasticizers.

Besides A-2 and A-4, the Pfizer CITROFLEX line includes CITROFLEX 2 (Triethyl Citrate), CITROFLEX 4 (Tributyl Citrate) and CITROFLEX A-8 (Acetyl Tri-2-Ethylhexyl Citrate). Check into the Pfizer CITROFLEX plasticizers today. Mail the coupon below.

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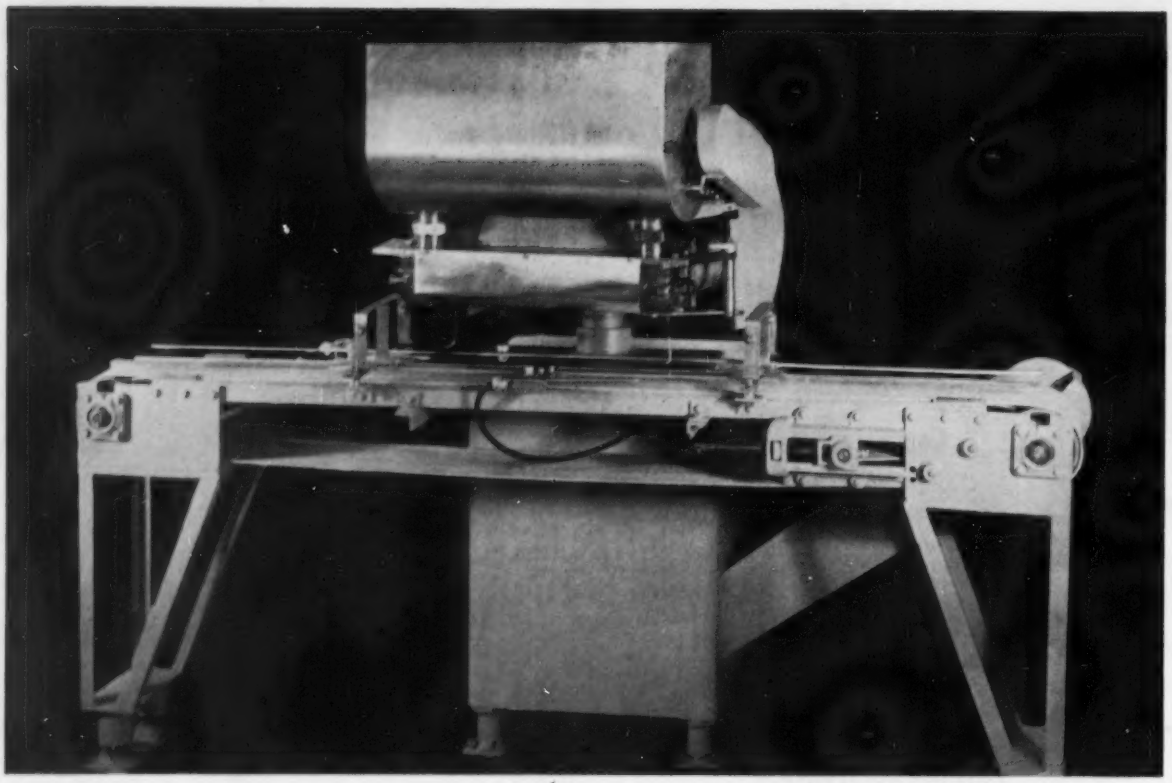

Fills one or two lines • Handles wide range of containers
Speed is adjustable • Packs many products
Assures positive, uniform measure

Announcing new Pfaudler twin piston filler

for problem filling jobs!

This new Pfaudler machine solves the problem of filling small lots of diversified products or widely varying containers.

It can handle practically any open-top cylindrical or rectangular can, jar, or rigid wax paper container.

It is designed to fill either one or two lines of containers. With two lines you can handle two sizes or types of containers simultaneously, from 2″ to 4½″ in diameter; in the one line position, the unit handles cans up to 8″.

By simply releasing the head pivot lock and turning the adjusting screw in the base you can raise the filling head or lower it to handle containers from 2″ to 7″ high.

By simply adjusting a screw in each piston you can vary the capacity of your fill from 3 to 65 fluid ounces. By filling from both pistons successively into one container, you can inject up to 130 ounces.

Pails and other large containers can be filled precisely by swinging the filling head away from the conveyor and tripping the release manually.

Up to 60 containers per minute can be filled depending on product and container size. Accuracy of fill is within plus or minus ⅛ ounce. This new Pfaudler product is engineered to package all types of viscous or semi-solid products. For complete details, ask for Bulletin 934.

If you are handling these products, investigate this new twin piston filler.

- Chicken a la King, chili con carne, process cheese
- Syrups, sauces, soups
- Apple butter, jellies, preserves, pie mixes
- Citrus concentrates, crushed pineapple, berries
- Baby foods, apple sauce
- Squash, creamed corn, pumpkin, creamed mushrooms
- Potted meat, dog food, cat food, other specialties

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an extracted meal containing less than 1% residual lipids.

Experimental work indicates that moisture content of raw peanuts might be adjusted to reduce amount of solvent-extracted meal to be recycled and yet yield meal with low residual lipids. Laboratory data indicate that a 100-ton a day cottonseed filtration-extraction plant could process about 45 tons of peanuts.—*Journal of the American Oil Chemists' Society*, 565-66, Nov. 1955.

For Maximum Popping Blend the Popcorns

Recent experiments have shown that blending over-dried with wet popcorn is an effective method of obtaining optimum moisture for popping expansion. Desirable range is 11-15% moisture, with maximum popping expansion at 13%.

Following preliminary experiments, final tests were made with two hybrid popcorns, portions of which had been overdried. Each of 24 overdried lots was blended with one wet lot of each variety in amounts to bring the theoretical average moisture to 12.5%. These blends were sampled periodically and popped to determine the time required to reach maximum expansion.

After 14 days' storage the 13 lots of one variety averaged 95.3% of maximum popping expansion. Eleven lots of the other variety averaged 96.2%. Storage for 49 days increased these averages to 98.4 and 98.0%, respectively, thus indicating that 14 days' storage was sufficient.

The 24 lots were also brought to 12.5% moisture with water. Popping expansion of these lots did not differ materially from those reconstituted by blending. As a result of the experiments, blending over-dried popcorn with wet popcorn is recommended as a commercial method of reconstitution.—*Food Technology*, 426-30, Sept. 1955.

Flour-Free Meat Coating

Particularly useful in coating frozen cuts of meat, especially ones that are boned, rolled, and tied, a patented formula has been developed that has advantages over previous coatings.

Ingredients of coating are: Meat-basting fat, 30-60; edible gelatin, 2-12%; cellulose gum, 0.05-3%, water, 30-60%. Animal or vegetable fats may be used. Good results have been obtained with 225-bloom gelatin.

NATURAL ENZYMES
for food processing

Rohm & Haas commercial enzymes are all natural products . . . and among the most effective aids in food processing.

They are easy to use and are well suited to the mild processing conditions common to the food industry. In service they provide many benefits. For example, they clarify fruit juices, tenderize meats, aid in the production of pre-cooked breakfast cereals, improve the texture of bread, and reduce the viscosity of chocolate sirups.

Rohm & Haas enzymes catalyze specific reactions; unwanted by-products are not formed. And little enzyme goes a long way toward increased production efficiency and greater consumer sales appeal.

Write to Department SP outlining your food processing problem.

A **PECTINASE:** fruit juices, concentrates, wines

B **DIASTASE:** bread, cereal-derived products, corn sirup

C **PROTEASE:** meat, fish, beer

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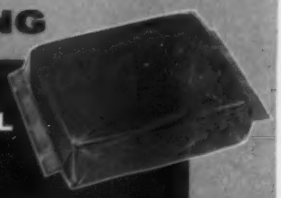

Fast operating CAMPBELL Wrapper Seals in flavor, freshness and color . . . with

Less than 2% package "Leakers"

- 98% of packages positively sealed — *guaranteed!*
- Eliminates shrinkage and color loss
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- 40 to 70 units per minute — double head
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- Increases sales appeal — wins new customers.

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Amazing, but true—and field proven by America's leading packers. Automatic, the machine requires only one person for push-button operation. And, savings up to 65% on wrapping materials alone are effected because wrapper tightly hugs the product—requires no costly bags, double wraps or large overlaps to insure *guaranteed* positive sealing.

High Speed Production — Sharply increased production effects further savings, too. Continuous feed, double vacuum head machine produces 40 to 70 units per minute—dependent upon wrap materials used. Single head machine—20 units and up.

Get The Facts Today — Learn about this revolutionary, new VACUUM PACK Wrapper — how and why its "leak-proof" packaging production can be *guaranteed*. Write for full particulars.

Guarantee

It is hereby guaranteed that out of every 100 units Vacuum-packed on a CAMPBELL *Vacuum Pack Meat and Food Wrapper in regular production service — 98% or more will be positively sealed against leakage at sealing areas of heat-sealing wrapping material used for the package.*

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Gum includes sodium carboxymethyl cellulose, and other cellulose derivatives such as the water-soluble, non-toxic cellulose ethers.

Cellulose gum and gelatin are mixed and liquefied in hot water. Melted fat is then added and mixture stirred until emulsion results. Prepared meats are then dipped in the emulsion which is kept at 105-145 F.

Coating contains no flour or other organic material that will char on cooking. The coated meats have a glistening white color, and the coating carries a large quantity of fat desirable for basting fat-deficient meat. Seasonings may be incorporated in the coating.—U. S. Patent 2,721,142, Oct. 18, 1955.

Drum Handling Mechanism

Automatic grappling and release of steel drums and similar articles by the fore and aft movement of a lift truck is accomplished by a patented attachment.

The mechanism comprises a horizontal beam attached to the vertically movable carriage with which the masts of commercial lift trucks are usually provided. This beam is fitted with front and rear grapple hooks designed to engage the beads or chines of a drum.

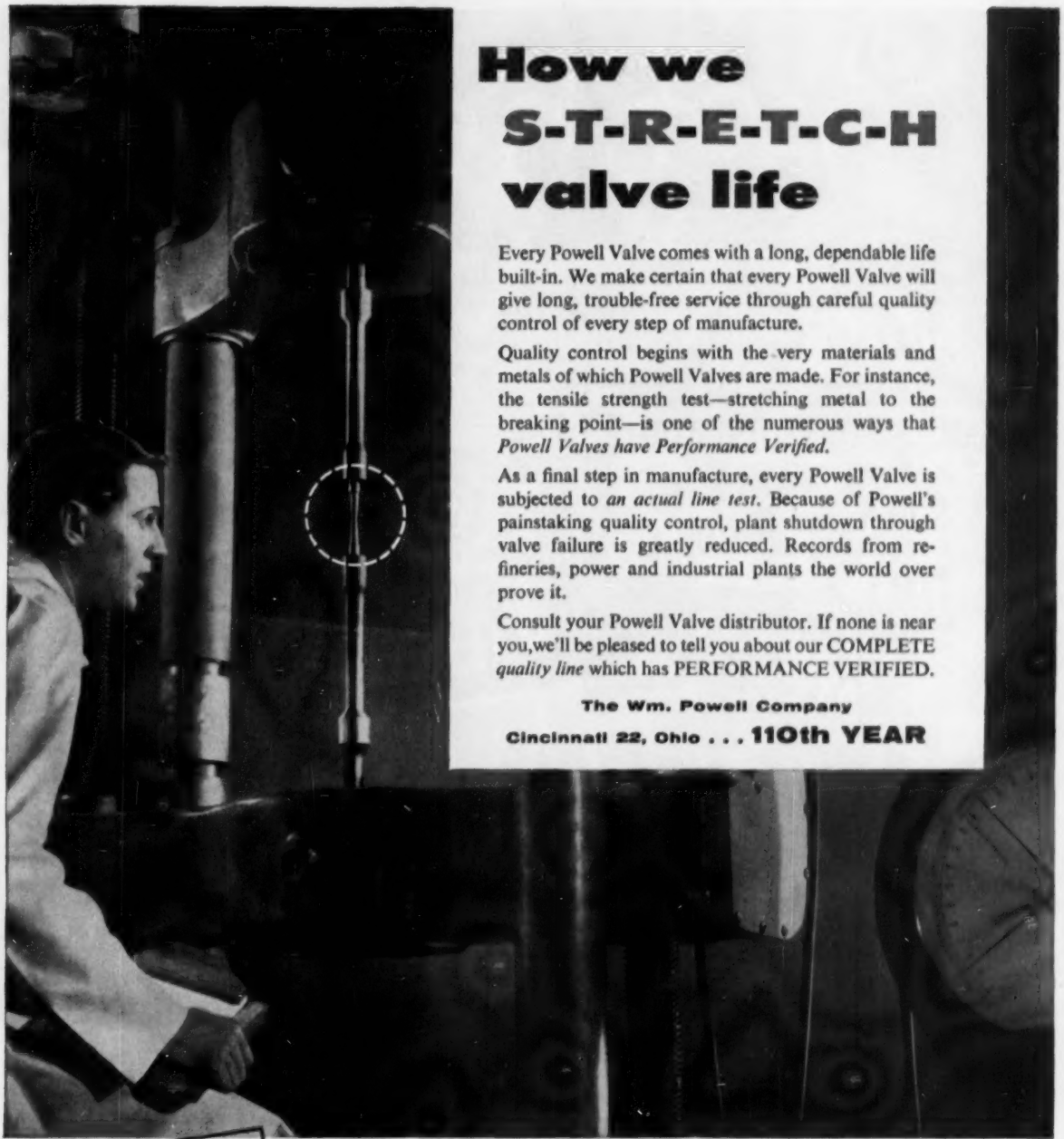
The two grapple arms are suitably articulated so that the forward arm will swing downward into engagement with the forward end of the drum after the rear arm has been brought into engagement with the rear end of the drum. After a drum has been engaged, transported, and deposited at the desired destination, grapple arms are readily moved to released position by a slight backward movement of vehicle.—U. S. Patent 2,720,992, Oct. 18, 1955.

Stable Citrus Concentrate

Production of frozen citrus concentrate which retains the flavor of fresh juice, and is free from objectionable separation after customary handling is the object of a recent invention.

In the process, extracted juice is separated into a supernatant liquid containing not more than 3% pulp, and a pulp fraction. Liquid is then concentrated at low temperature to approximately 60 deg. Brix.

Pulp fraction is pasteurized by heating to 135-185 F. for not more than 3 min., cooled and added to concentrated liquid to give desired final Brix. Product is then canned and frozen by conventional method.—U. S. Patent 2,724,652, Nov. 22, 1955.



How we S-T-R-E-T-C-H valve life

Every Powell Valve comes with a long, dependable life built-in. We make certain that every Powell Valve will give long, trouble-free service through careful quality control of every step of manufacture.

Quality control begins with the very materials and metals of which Powell Valves are made. For instance, the tensile strength test—stretching metal to the breaking point—is one of the numerous ways that *Powell Valves have Performance Verified.*

As a final step in manufacture, every Powell Valve is subjected to *an actual line test.* Because of Powell's painstaking quality control, plant shutdown through valve failure is greatly reduced. Records from refineries, power and industrial plants the world over prove it.

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FIG. 2491—O.S.&Y. Gate Valve For 150 Pounds W.P.

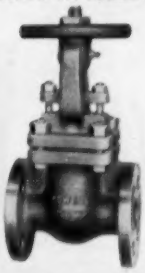

FIG. 1559—150-Pound Steel Lubricated Plug Valve. Sizes 1" to 4".

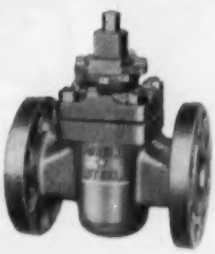

FIG. 2608—Bronze "WS" Full Flow Globe Valve For 200 Pounds W.P.

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BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

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press, radio and T.V. hail era of pre-
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By IMOGENE PATRICK
FOOD ENGINEERING
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Newsweek
'Antibiotic' Poultry Endorsed By FDA; To Go On Sale Soon
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news

bigger

ACRONIZED*!

SCIENCE NEWS LETTER

New Process

THE DAILY OKLAHOMAN

The Des Moines Register

Times.

THE WALL STREET JOURNAL.

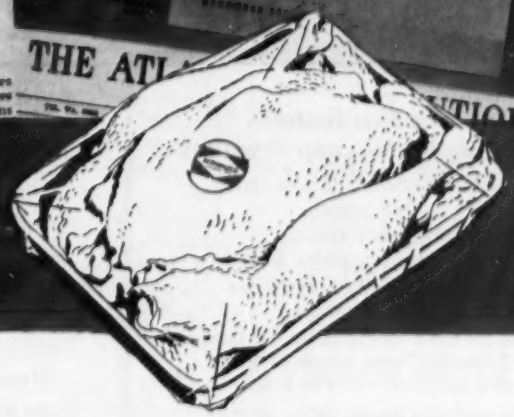
Chain Store Age

w Process Keeps Food Fresh,

n Increase Perishable Supply

packaged poultry!

*ACRONIZED is a trade-mark of American Cyanamid Company



You may have *felt* people were ready for pre-packaged poultry . . . but the nationwide reception given the announcement of Acronized chicken has *proved* it!

No event in poultry history has ever launched such an avalanche of enthusiastic comment. For this new process effectively prolongs the freshness of fresh-killed poultry, and now makes possible centralized pre-packaging.

ACRONIZED is the process cleared by the Government for use of an antibiotic in food processing. It is an exclusive development of American Cyanamid Company based on its *chlortetracycline*, which years of testing and research have proved the most effective of all known antibiotics for maintaining food freshness.

Acronized ends the usual "incubator effect" of packaging, and maintains freshness without changing the poultry's odor, color, or taste.

Yet Acronized requires virtually no change in your processing routine! You simply add Acronized solution to your chill tanks. Then, whether you pack the birds individually or in bulk, the growth of spoilage bacteria is retarded all the way to the consumer.

Now, while public interest is gaining momentum, is the time to protect your poultry with this revolutionary new process. *Write today* for details on how your plant may qualify for the Acronized franchise.

AMERICAN CYANAMID COMPANY
Fine Chemicals Division, 30 Rockefeller Plaza, New York 20, N.Y.

All-new BLISS bodymaker has 450-a-minute speeds!

Compact NEW design speeds changeovers assures dependable operation

One of the industry's fastest, the new 403 Bodymaker is capable of 400 to 450 per minute *shift-after-shift-after-shift.* And here's why. Short-stroke, short-length cranks permit higher speeds; well-balanced components combined with Meehanite construction practically eliminate vibration. In addition, all adjustments are accessible, quickly and easily made which lessens downtime. Simple to set up, the 403 is readily adaptable to #202 to #404 plain, lacquered or lithographed sanitary can bodies.

The 403 is the latest in Bliss' new line of automatic, high-speed can machinery . . . including the 8-station, round can flanger; a wider, faster, quick-to-set-up scroll shear; and Bliss' already famous strip feed press. With more to come from the new can plant at Hastings (Michigan), you'd be wise to keep your eyes on Bliss.

Meanwhile, why not learn more about the 403 Bodymaker and other Bliss can machinery by writing to—

These modern Bliss features step up production, step down costs

- Compact table with no idle station means no wasted space
- Actuated in-and-out knurler provides more even solder flow
- Notcher, double-action edger are quickly and easily adjusted
- Cam-actuated overhead blank lock and fixed forming horn assure perfect control of blank and can body
- Overhead can carrier drive permits easy accessibility to solder attachment
- Solder pot is adjustable, quickly and easily removed
- Inside or outside seam solder attachments are available

***NEW* CATALOG NOW AVAILABLE**

For complete details on the 403, and other Bliss bodymakers, write today for Section 3, Catalog 36-B.

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CAN MACHINERY DIVISION: HASTINGS, MICHIGAN

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BLISS CAN AND CONTAINER MAKING MACHINERY

SLITTERS

BODYMAKERS

FLANGERS

SEAMERS

TESTERS

STRIP FEED PRESSES

Rail-Car Sanitation

—*Continued from page 89*

New York. It comprises: A 30-hp. multi-stage centrifugal exhauster; 36-in. combination dust separator; 2-in.-i.d. flexible hose; cleaning tools, and a stationary piping system.

Latter is 3-in. i.d. and about 200 ft. long. It is installed alongside the tracks and has spring-loaded inlet valves strategically located about a car-length apart. Spring covers on the valves aid in keeping constant vacuum, since they prevent an operator from leaving a valve open after use.

This pipe runs from the tracks to a building, about 35 ft. away, that houses the separator. Material picked up in cleaning goes through the pipe to the separator, and then into a low-pressure line that carries it to the plant's dust-collecting system.

Sanitation Measures

First, operators go over the car's side walls, pounding them with wooden mallets to loosen any contaminants that might be lodged between inner and outer walls. Then, the car is thoroughly swept. Next, two men using cleaning tools with flexible hoses vacuum the car inch by inch.

This system, designed for high vacuum and air flow at the cleaning tool, enables thorough cleaning. And the entire process takes about 40 min. per car.

After the car is loaded, and before it is sealed for shipment, laboratory personnel take final probe tests as added protection. Federal procedures are used and samples are kept for one year. In isolated cases, it is necessary to make comparative tests of shipments at their destination because of reloading en route.

So satisfactory has this system proved that Rahr engineers are planning to instal several other units for plant house-cleaning.

End (*Resume reading on page 90*)

Specializing in Specialties

—*Continued from page 52*

then the tins are packed in retort crates with wire screens separating every 4 to 5 layers.

Sandwich Filling Line

Packed in No. 2¼ cans (30 oz.) at 30-per-min. in the general specialty meat-processing department are sandwich-type fillings. These include chipped pork and barbecue sauce, beef slices and barbecue sauce, chopped beef and barbecue sauce, boned chicken filling, and chopped ham and gravy.

For chipped and sliced items, meats are cut on a modified bacon slicing machine and loaded in perforated stainless steel crates for live-steam cooking. Meat broth is saved and used in making sauce.

The sauce is made in 225-gal., steam-jacketed kettles with vertical, propeller-type agitators. Then it is added to the cooked, sliced meat in a 800-lb. sausage mixer.

Batch is transferred to a circular 20-pocket, hand-pack filling table (FMC), and manually filled in cans. Following check-weighing lids are applied and cans vacuum-sealed. Then they are heat-processed, cooled, labeled, and packed in cases which are glued and sealed by portable labeling and casing machines.

Line can be quickly adjusted to handle cans from squat No. 2's through No. 2¼'s.

Also prepared in this department are tomato, vegetable, chicken and noodle, and chicken and rice soups that are packed in No. 1 and No. 10 cans. Noodles, for example, are fed into cans by the hand-pack filler. Broth is introduced by a 10-pocket, FMC volumetric filler. Cans are then vacuum-sealed.

Making 16-Oz. Specialties

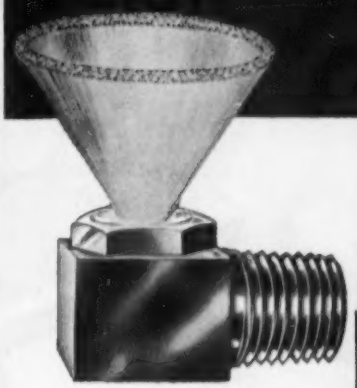
Prepared on the fourth line are spaghetti and meat balls with tomato sauce, brown gravy and sliced beef, brown gravy and sliced pork, ham gravy and sliced ham, and mushroom gravy and Salisbury steak.

For spaghetti and meat balls, spaghetti is steam-blanched in kettles, then drained, and dumped on a round table for feeding the hand-pack filler. Approximately 5¼ oz. are filled in each can, which is check-weighed along a conveyor line.

Further along, six girls hand-feed 4 meat balls (¾ oz. each) into a can. Sauce (8 oz.) is then added by a rotary, 12-head, displacement-type volumetric filler. Cans are sealed, processed in 4-crate capacity retorts, water-cooled, and dried as they are conveyed to the wrap-around labeler before packing in shipping cases.

In preparing meat balls, ground beef is loaded into 300-lb. sausage stuffers hooked in tandem. As one is loaded, the other forces meat, under a pressure of 90 psi., into a company-designed meat ball-forming machine. A short (7-in. dia) horizontal worm breaks up air pockets as the meat is forced into a 6-in. dia. vertical pipe. From here it continues, under air pressure, to a 1-in. dia., horizontal extrusion pipe. As the meat discharges, a rotary, pulley-driven, 2-bladed knife

LESS CLOGGING WITH Monarch



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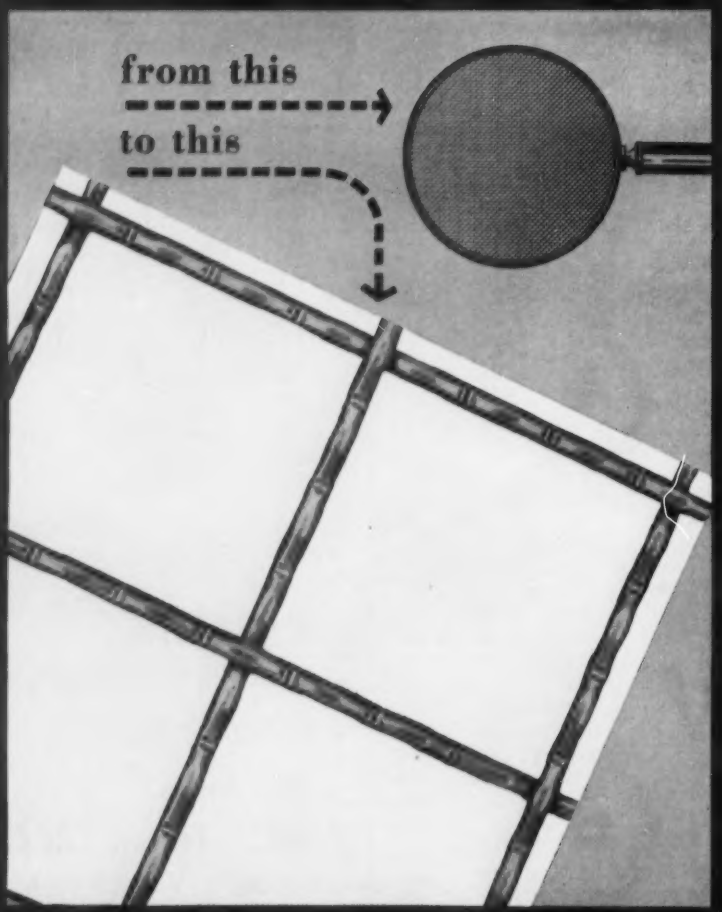

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cuts it into ¾-oz. balls that drop into a conveyor, as they are collected into aluminum containers.

Tomato sauce is prepared in two 150-gal. stainless steel tanks, equipped with live steam-heating facilities and horizontal, paddle-type agitators. It is then gravity fed to the rotary filling machine.

The slowly revolving paddles prevent emulsification of vegetable oil in the sauce, thereby avoiding undesirable cloudy effect. What's more, they guard the deep red, natural color of the tomatoes. Too violent an agitation results in a light-colored sauce.

This line handle 65 cans per min.

Canned Baked Goods

On the final line are prepared cakes and puddings baked in cans. Canned fruit cake (65% fruit, 35% batter) is packed in key-opening type ration tins for the armed forces.

Girls, working on a partitioned scaling table, weigh into stainless steel pans such glazed fruits as citron, orange peel, cherries, pineapple, white and dark raisins as well as sliced almonds. Separately scaled in another section are spices and seasonings, flour, salt, sugar, and fresh whole eggs. Shortening is melted in a 200-gal. stainless steel kettle.

Batches (110 lb.) are made up in beater-type bowl mixers. Bowl is then raised by an electric hoist to dump batter into hopper feeding rotary, plunger-type, 10-pocket, FMC volumetric filler. Batter (5¼ oz.) goes into tins lined with fluted, parchment paper, then cans proceed to a 4-spindle clincher.

An automatic loading device feeds 24 cans at a time into a 74-ft., gas-fired, thermostatically controlled, traveling-tray oven (total 167 trays). Loading device comprises a chain-driven pusher bar mounted on wheels riding over tracks. Movement of bar, synchronized with speeds of oven and infeed conveyor, is forward and backward.

After 60 min. at 330 F., cans are discharged from front end of oven and into a 4-spindle vacuum-closing machine. They proceed along an 80-ft. cooling conveyor with overhead water sprays that lower internal temperature from 220 to 125 F. during the 1½-min. travel.

A vacuum of over 12 in. is assured as the cans continue to a Continental Can Co. 4-head flip tester. Machine draws a vacuum against the lid and, if vacuum in can is less than 12 in., the lid flips outward. A pin is then contacted to close an electric circuit and actuate a can-rejecting arm.

End *(Resume reading on page 53)*

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Questions & Answers

THIS MONTH'S PROBLEM

Making Turkey "Logs"

Question—Is any information available on the preparation of turkey rolls—an all-turkey meat item put up for the institutional trade? Product is somehow frozen into log-shaped rolls of about 10 lb. It needs only cutting into portion-size slices and cooking. Can you also suggest percentages of white and dark meats?

JANUARY PROBLEM

Making Dehydrated Soups

Question was—Our company plans to manufacture tomato bouillon and dehydrated soups such as pea, bean, vegetable, mushroom, onion, and chicken. Do you have formulas for these items?

Answer—We'll list the formulas in order mentioned above:

Tomato Bouillon—Blend the following: Monosodium glutamate, 10 lb.; yeast bouillon, 10 lb.; onion powder, 4¾ lb.; soluble celery (sugar base)*, 4 lb.; soluble allspice (sugar base), 1 lb.; soluble pepper (sugar base), ¼ lb.; fine flake salt, 52 lb.; dehydrated tomato flakes, 20 lb.; and cane sugar, 18 lb.

Use 5g with 6 oz. of hot water.

Dried Pea Soup Mix—Seasoning mix is made by blending: Soluble celery (sugar base), 30 lb.; soluble ginger (sugar base), 7½ lb.; soluble coriander (sugar base), 4 lb.; soluble cardamom (sugar base), 5 lb.; soluble foenugreek (sugar base), 20 lb.; soluble pepper (sugar base, 2 lb.; tumeric (ground), 4 lb.; domestic paprika, 2 lb.; soluble cinnamon (sugar base), 5 lb.; and dextrose, 20¼ lb.

Soup blend consists of: Seasoning blend (above), 15 lb.; monosodium glutamate, 10 lb.; vegetable protein hydrolysate, 15 lb.; onion powder, 15 lb.; garlic powder, ½ lb.; salt, 41½ lb.; and smoke flavoring, 3 lb.

Use 15% soup blend and 85% pea powder. To 3 oz. of this mixture, housewife adds 1 qt. of water.

Bean Soup—Seasoning blend comprises: Soluble celery (sugar base), 8 lb.; soluble allspice (sugar base), 3 lb.; soluble clove (sugar base), 1½ oz.; soluble cinnamon (sugar base), 1½ oz.; soluble bay (sugar base), 3¾ oz.; and salt, 8 lb.; 9¼oz.

Soup blend: Seasoning blend, 20 lb.; monosodium glutamate, 8 lb.; vegetable protein hydrolysate, 15 lb.; yeast bouillon, 10 lb.; onion powder, 20 lb.; garlic powder, 1 lb.; salt, 25 lb.; and baker's yeast, 1 lb.

Use 15% seasoning, 42½% beans, and 42½% bean powder. Add 4 oz. of this bean soup mix with 4½ cups of water.

Vegetable Soup—Blend following: Monosodium glutamate, 14 lb.; onion powder, 10 lb.; garlic powder, ¼ lb.; bean soup blend (formula above) 12½ lb.; salt, 55 lb.; and dextrose, 8 lb.

Use ¼ oz. of above seasoning with ¾ oz. of mixed vegetable flakes. Add 1¼ oz. of this vegetable soup mix to 4 cups of water.

Mushroom Soup—Add together: Onion powder, 18¼ lb.; garlic powder, 1 lb.; soluble celery (sugar base), 10½ lb.; soluble cardamom (sugar base), 1 lb.; soluble pepper (salt base), ½ lb.; dextrose, 15 lb.; monosodium glutamate, 9½ lb.; and salt, 44 lb.

Use 8¼ oz. of above seasoning with ½ oz. of dehydrated mushrooms, 10 oz. of wheat flour, 1 oz. of Clearjel**, and 2-2½ gal. of milk, (or its equivalent with nonfat milk solids).

Onion Soup—Mix together: Monosodium glutamate, 10¾ lb.; meat extract (on salt), 8 lb.; yeast bouillon, 9¾ lb.; onion (coarse ground), 4½ lb.; soluble celery (sugar base), 4 lb.; soluble bay (sugar base), 4 oz.; soluble cardamom (sugar base), 2 oz.; soluble pepper, (sugar base), 2 oz.; caramel powder, 1¾ lb.; salt, 27 lb.; dextrose, 5 lb.; corn syrup solids, 8 lb.; tricalcium phosphate, ¾ lb.; and toasted onion (granular), 20 lb.

Use 6½g of above mix to 6 oz. of water.

Chicken Soup—Blend together: Monosodium glutamate, 13¾ lb.; onion (coarse ground), 2½ lb.; soluble celery (sugar base), 4½ lb.; soluble clove (sugar base), ⅛ lb.; soluble coriander (sugar base), ⅛ lb.; soluble thyme (sugar base), ⅛ lb.; soluble pepper (sugar base), ¾ lb.; tumeric (fine grind), ¼ lb.; paprika (fine grind), ⅛ lb.; salt, 38½ lb.; corn syrup solids, 20 lb.; dextrose, 20 lb.; and parsley flakes, ¼ lb.

Use 5g of above mix with 6 oz. of hot water. With 20% chicken fat, use 6g to 6 oz. of hot water. Use same as above, but add ¼ oz. of precooked rice.—*Roy E. Morse, Professor of Food Technology, Rutgers University, New Brunswick, N. J.*

*Solvent-extracted oleoresins (flavor constituents of natural herbs, seeds, and spices).

**Modification of Amoica (domestically bred waxy maize), National Starch Products Co.

HOW TO DO IT?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise.) We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

New Product Suggestions

Question—Food Engineering editors are usually on top of the latest developments in the industry. So, we would like to get a list of consumer-convenience-type items awaiting development. Any ideas?

Here are five possible products which, judging by field observations, might be developed:

1. Wafer confection—as of rice flour, sugar, water, and oil of peppermint. Form into 2-in. squares (about $\frac{1}{16}$ in. thick). Enrobe with chocolate or confection to produce a chocolate wafer thin mint.

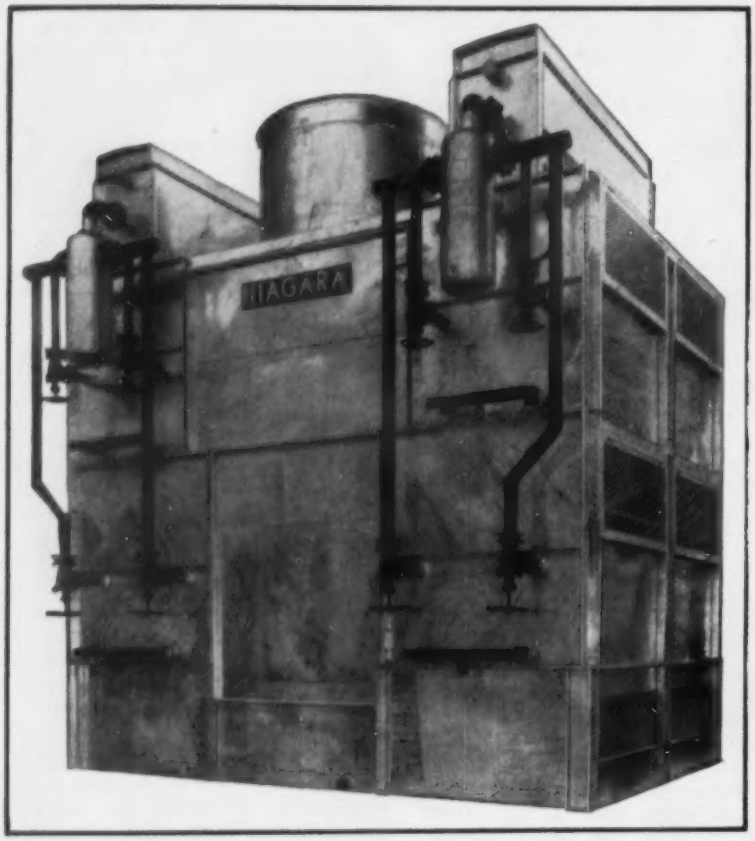
2. Alcoholic beverage powder (beer or wine)—There are references in the literature on producing the solid, ethyl carbonate which, when reconstituted with water, produces ethyl alcohol and releases CO_2. Such a powder would, of course, contain flavoring, coloring, organic acids, salts, etc.

3. Weather-planned delicatessen mixes—There's great need for cool summertime foods like potato, chicken, macaroni salads that require no consumer preparation or baking.

4. Whip cream powder—Many attempts have been made to produce this product but, to date, this product is not on the market.

5. Ice cream powder—Actually, there is no foolproof ice cream mix, to which the consumer simply adds milk and then freezes. All present products require a mixing step to control ice-crystal growth, and temperatures in average home-type refrigerators are too high for formation of small crystals. Perhaps, by the use of a suitable hydrocolloid, crystal growth can be controlled without need of mixing. And aeration of the frozen product might be achieved by including a leavening-type agent to the powder.

Large refrigeration plants save money with NIAGARA high efficiency condensers



IN size ranges from 100 to 450 tons refrigeration Niagara's "Super" Condensers save power, save large cooling water and water handling expenses and help the user avoid most of the upkeep problems and troubles of a refrigerating plant. Always full condensing capacity is assured by the "Duopass" pre-cooling coils which remove the superheat and bring about condensing at low temperatures. Complete accessibility assures labor saving, inexpensive upkeep.

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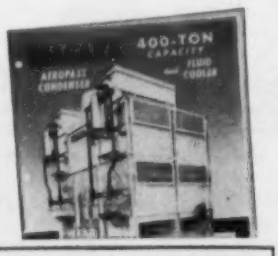
District Engineers in Principal Cities

Write for complete information. Ask for Niagara Condenser Bulletins 123 and 131.



NIAGARA *Over 40 Years' Service in Industrial Air Engineering*

Canning Pickles

Question—In the past years we have been packing a rather large volume of pickles—mostly barrel dills and sweets. This coming season we would like to pack about 5,000 No. 10 cans of "fresh" or "pasteurized" pickles. Could you furnish me with a formula for cover brine on this type of pickle?

I would prefer one that will permit me to have mixed certain quantities of given ingredients to produce a given gallonage of the cover fluid, rather than one requiring use of test instruments. I would also like information on how to pack the pickles and temperature and time of cook. Information on No. 10 cans would also be helpful.

Answer—A cover brine should contain about 1% acidity and 5% salt. It can be made up in units of about 12 gal.; 120 grain vinegar, 8½ lb.; salt, 5 lb.; and water, 86¾ lb.

Depending upon the quantity packed at one time, you may, of course, wish to make up larger batches, using multiples of the above amount. If formulation is entirely on a weight and volume basis, use of instruments can be avoided by retaining a small sample of each batch of brine for laboratory checking—percent acidity (by simple titration) and percent salt (by salometer reading).

Actual packing of pickles into cans is probably best accomplished by a manual jumble or throw pack. While some pickles are place-packed, they are usually in glass where appearance must be attractive. We suggest use of a stainless-steel-topped table along which the packers can sit on stools and on which bulk pickles can be dumped.

Packers should, of course, wear rubber gloves, and proper attention should be given to their personal cleanliness. The cans may be handled to and from the packing table by either conveyor or carts equipped with racks.

After packing, 190 F. brine is added. An alternate method is to heat

---

Q.—Have you any information on the use of plastic aisle markers for storage areas?

A.—Available are dotted line aisle markers that are made of durable plastic material. Circular markers are 0.005 in. thick and 2, 3, 4, and 5 in. dia. They come in five bright colors—neutral white, alert orange, fire red, safety green, and caution yellow. And they adhere (without moistening) to any clean, dry floor.

---

cans and contents to at least 170 F. in an exhaust box before applying covers.

Processing is said to require 8-10 min. at 185 F. Another, and perhaps simpler method in your case, is to process in boiling water.

As to cans, there is considerable danger from pinholing, and heavily lacquered cans are recommended. It would be well to check with your supplier for his specific recommendation on the can, as the manufacturer may have experience on similar applications which is not available elsewhere.

We also suggest that you take up your problem with your own state agricultural experiment station. It happens to be one of the best known centers of research in pickle technology. And it probably has publications available for distribution which should prove most helpful.

Better Ricotta Cheese

Question—We manufacture the Italian cheeses Ricotta and Mozzarella. Now we are seeking a method of producing a better-tasting Ricotta cheese. Could you outline a procedure for making a better Ricotta? For your information, here's the procedure we follow:

We use whole milk. When whole milk is not available, we switch to skim, and add enough 40% cream to bring the butterfat to 4% which, according to that blend, should produce a very good finished product. To our 4% blend, we add enough buttermilk to bring the acidity to 0.44%. This mixture is heated in a jacketed kettle to 180 F. At that point, the Ricotta cheese rises to the top and is scooped off.

After part of the cheese is removed, more heat is sent through the jacket, bringing the temperature to 195 to 200 F., then more milk and acidity are added to the remaining whey until all the cheese is out. Whey is then clear, indicating that no more protein is left.

Answer—We have just received a report from Cornell University on some work conducted by Windlan & Kosikowski on Ricotta cheese. In their studies, high quality whole milk (3.6-3.9% fat) was placed in a small stainless steel kettle, and the acidity adjusted by addition of lactic acid. Temperature was then raised by direct steam injection. Rate of injection was adjusted so that 30 min. were required to cook the cheese.

When cook temperature was reached, cheese was allowed to mat for 10 min., then removed, and placed in perforated cans. A second separation was obtained by adding citric

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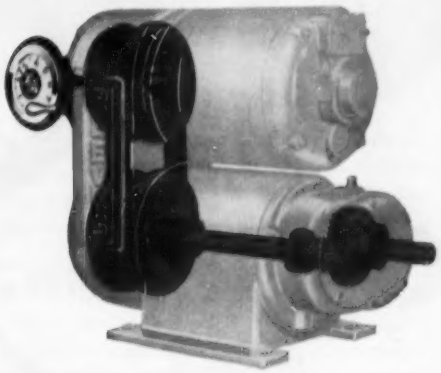

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acid and heating. Product was cooled by placing cans in running cool water.

Best results were obtained by: (1) Using high quality whole milk, (2) adjusting acidity before heating to 0.30-0.31% with lactic acid starter, and (3) cooking at 178 deg. F.

They found cooking temperatures below 176 F. gave low yields and above 180 F., quality was poor.

Acidities of 0.28% resulted in no cheese being formed, and 0.35% gave excellent yields, but cheese settled to the bottom of the kettle making it hard to recover. Also, cheese at this acidity was hard and grainy.

No information was given as to acidity or temperature used to obtain the second separation.

From the above, it looks as though your cheese might be improved by use of a whole milk starter, and a citric-acid solution for the second acidification.

More on Freezing Coconuts

Since answering a recent question on preparation and freezing of fresh coconuts (FE Jan., p. 176), it has been learned that a major food company is now freezing and test-marketing this item in a Southern state.—*Editor.*

Moisture Condensation

Question—During the recent cold weather, we have experienced troublesome condensation of moisture at windows in drying areas of our macaroni-processing department. Is there any effective way of overcoming this annoying and unsanitary condition?

Answer—Various macaroni manufacturers use different methods to combat it. Probably, there is no simple solution, as the amount of inconvenience depends partly on weather conditions and type of building construction.

If you have masonry walls and steel factory-type sash, you might try installing outer storm windows. Heat losses will be cut, and this may decrease the condensation. Cost of the installation would be relatively small. But you would have the problem of storing the storm windows during warmer weather.

A further step would be to replace the sash with glass blocks, which have a lower rate of heat loss. This eliminates window ledges, thus premises are easier to keep sanitary.

Another method might be borrowed from other branches of the food industry, where trouble is sometimes encountered on the ceiling of the floor below a cold-storage room. Here, they

rapidly circulate air across the chilled surface—in your case, the windows—so there is less time for it to cool to its dewpoint and deposit moisture. This installation requires a few carefully placed air-circulating fans.

Probably the most effective solution is the simple one of eliminating all windows. The obvious drawback is that artificial lighting and ventilation must then be provided to compensate for that presently provided by your windows.

Cooling Salad Oils

Question—For some time, we have been considering installing a cooler to lower the temperature of vegetable oils (used for making dressing products) to about 50 F. Contacts with many firms have left us somewhat confused as to the best method. Would you have any specific information on recommended procedures?

Answer—Key to the confusion may lie in the viscosity vs. temperature characteristics of oils in the neighborhood of 50 F. While we do not have specific figures to cite, it is our understanding that there is a "break" in the curve, and that the actual viscosity, at and below 50 F., is considerably higher than the value that might be expected from observations at room temperature.

Where this comes into the oil-cooling picture, of course, is in the heat-transfer coefficient for a cooling surface with oil to be chilled on one side, and a refrigeration medium on the other. This coefficient depends upon oil viscosity among other things, because viscosity affects the thickness of the oil film on the heat-transfer surface. The cooler the oil becomes, the thicker the film and the slower the rate of cooling.

We suggest, therefore, that you begin obtaining viscosity data in the temperature range you wish to handle the oil. Data may be procured from refineries and suppliers of salad oils, or by direct laboratory measurement (if you have facilities). Then you can present this data along with other pertinent performance specifications to several manufacturers of heat-exchange equipment and obtain their recommendations and proposals.

Q.—How'll I freeze French fries (potatoes) so they won't stick together when packaged and frozen in 15-lb. institutional packages?

A.—Best thing is to individually freeze the French fries on a conveyor belt going through an air-blast type freezer. Then package the potatoes.

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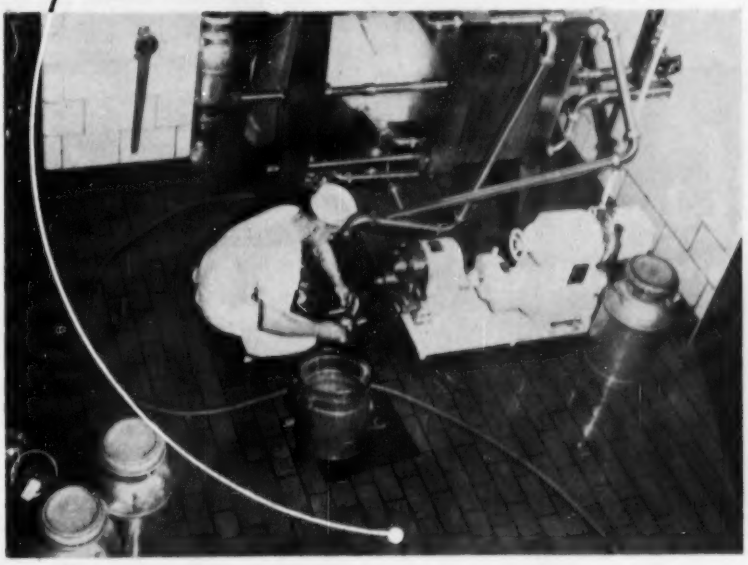

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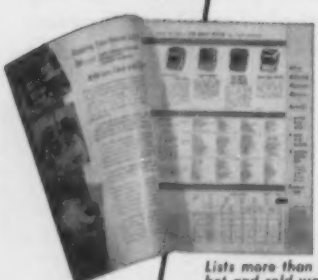

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Speaking generally, you will want a cooler that minimizes film-thickness effect. And this suggests use of a high-velocity circulation device such as a shell-and-tube heat exchanger or a plate-heat exchanger. Either should give much greater cooling efficiency than, say, an agitated tank with cold wall or cooling coil.

As for cooling medium, sweet-water should suffice if 50 F. is the minimum. Should you wish to provide for lower temperatures, you may consider brine.

You may wish to analyze your demand for cool oil to see whether it is periodic and infrequent enough to make use of an ice-accumulation type of sweet-water cooler. This generally is more economical from a power standpoint.

Butterscotch Topping

Question—*We are not satisfied with our present formula for making butterscotch sauce for ice cream sundaes. Can you furnish us with a formula for making a quality butterscotch topping?*

Answer—Introduce into a steam-jacketed kettle and rapidly cook to 228 deg. F.: Brown sugar (medium yellow or golden brown), 50 lbs.; "Sweetose" (Staley's corn syrup), 50 lb.; water, 33 lb.; and salt, 1 lb.

Turn off heat, and mix well into batch vanilla or flavor to suit. Then fill hot into containers and seal.

Product may be used as is or 2 oz. of melted butter may be added to each quart of the topping, stirring mixture well before serving.—*Formula by Staley Mfg. Co., Decatur, Ill.*

Making Spread Cheese

Question—Do you have information on the manufacture of spread cheese, sometimes referred to as cheese food? It is usually made from aged cheddar, milk solids, flavoring, and water. Product referred to is chiefly sold to taverns.

Answer—Spread cheese is made similarly to process cheese, the difference is in composition and spreadability.

Process cheese should be made entirely from a blend of cheeses and, in the case of process cheddar, should contain not more than 43% moisture and not less than 47% fat in the solids.

Cheese spread contains other dairy products such as skim milk, cheese whey, or whey albumin. It may also contain fruits, vegetables, or meats. It may have from 44 to 60% moisture and as little as 20% fat. Also, it must be spreadable at 70 deg. F.

Lab tests prove new overwrap gives highest gloss at low cost

Readings taken with Photovolt Glossmeter show new coated paper matches gloss of laminated transparent stock.

Laboratory tests prove that the new overwrap coated with A-C* POLYETHYLENE-wax blends has a gloss rating equal to that of laminated transparent stocks. Yet it costs 40 to 50% less!

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How ATLAS products make

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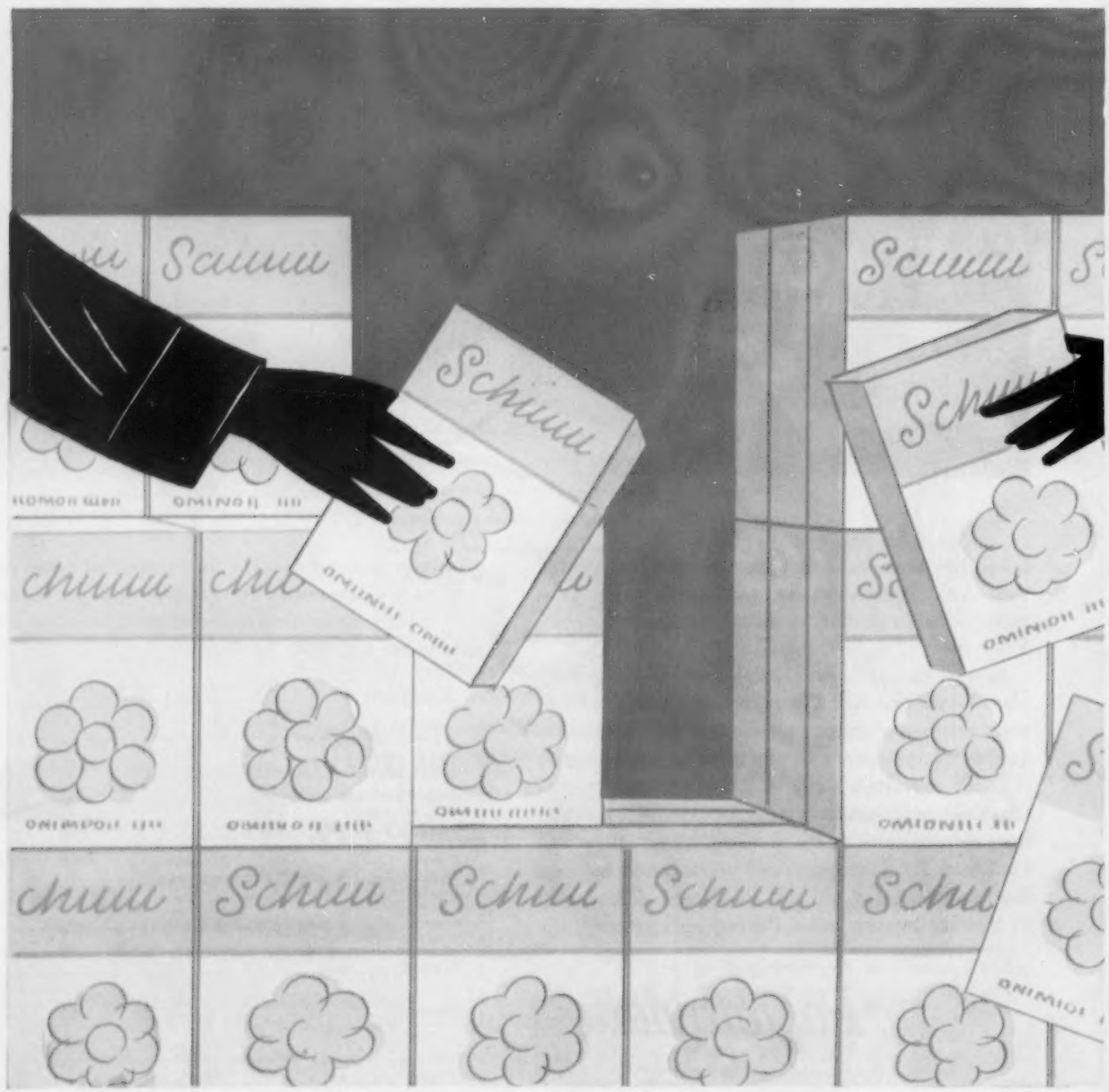
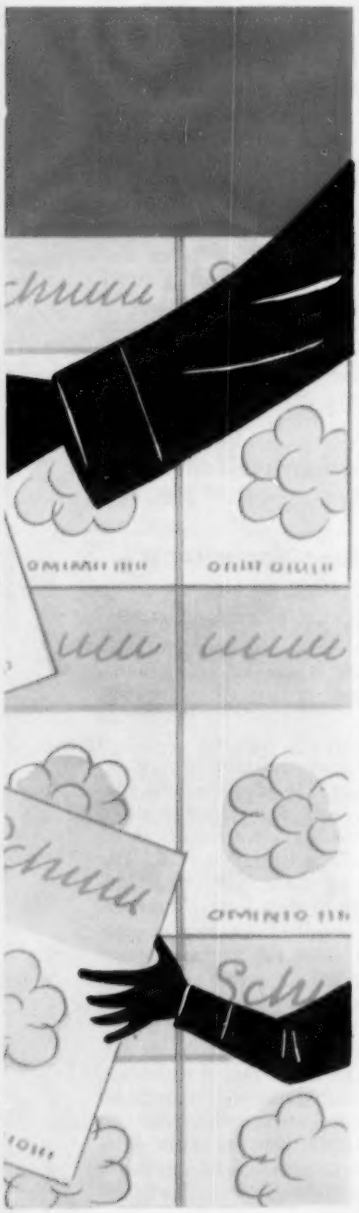


SELL BETTER



Atlas sorbitol and emulsifiers build consumer acceptance for many food products

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Saves Packaging $$

—Continued from page 82

When this valve opens, a second valve on the pitched tube closes momentarily to prevent overfills.

Completed bags are cut apart and automatically clipped to a rotating chain that conveys them to the stapler.

Tags, string, and stapling wire are all fed from continuous rolls. String is stapled to each tag as it is cut from the continuous strip. Tea bags are inserted in the looped string, and fastened with a staple.

Completed assembly, then passes into the stacking and counting device for boxing.

McCormick packs bags in 16-, 48-, and 100-envelope cartons. Thus, for the first two sizes, stacker and counter pockets are set for a full 16 bags. For the large-size container, they are adjusted to deliver 10 bags each.

As operators pack boxes they inspect bags for flaws. A final inspector, stationed at the box closer, double checks quality.

End (*Resume reading on page 84*)

Tripling Handling Speed

—Continued from page 71

beam, and a relay opens the safety door (after a 4-sec. delay to allow time for positioning pallet).

Rising, at a speed of 60-ft.-per-min., the door strikes a switch that activates floor conveyor, and pallet moves toward gig at rate of 30-ft.-per-min. When the load strikes a contact on floor conveyor, gig conveyor rolls, and pallet moves into car.

Here, a limit switch stops floor conveyor and shuts safety door. Gig will not move unless this door is closed. If a pallet is not in proper position—thus preventing door from closing—a door slack-cable switch will stop all action until condition is remedied. When everything operates correctly, closed door activates a contact and hoist motor starts.

Gig-lifting mechanism consists of a 5-hp., 1,750-rpm. motor. It has a helical-worm speed reducer and double-output shaft. This combination raises gig vertically at a speed of 50-ft.-per-min. until it is within 2 in. of the discharge door. Here, the special leveling device takes over.

Cams on the gig trip a limit switch in lift shaft, which cuts off hoist motor and transfers power to a 3-hp. leveling motor. Gig then moves gently into place at 5-ft.-per-min. At final position, gig trips a switch that stops leveling motor and actuates door-opening mechanism.

Transfer of pallet onto second floor conveyor is reverse of loading procedure. If a fork truck is not waiting to pick up delivered pallet, system will automatically stop after delivery.

Added Safety Features

Main control panel is generally located on first floor wall, behind elevator shaft. Individual control boxes are placed beside each safety door. They are used to energize system and reverse direction of pallet flow.

Indicator lights are suspended over each floor conveyor. These serve to show if a pallet is breaking photo-eye beam on the other floor.

All steps in the conveying-elevating operation are interlocked to prevent pallets from piling up on floor conveyors, and doors from opening when gig is not in proper position.

In addition, a pendant switch over each of the floor conveyors enables fork truck driver to stop entire operation in event of an emergency. And a slack-cable switch transfers load weight to an alternate cable if regular hoisting cable goes slack or breaks.

Oversize-pallet detectors, beside the safety doors, contain switches that immediately stop conveyors if struck by a pallet. When this happens, pallet must be repositioned or removed and detector switches reset before conveying can be resumed.

To prevent anyone from riding in lift, safety plates are placed between chains on gig floor. Any weight on these plates prevents gig from starting.

End (*Resume reading on page 72*)

Multi-Stage Vacreator

—Continued from page 76

water due to steam stitching have been fully attained in practice. It is a fundamental principle that the percentage of steam saved depends on the degree of taint removal required. Thus, a plant in which the taint-level is reduced to, say, 5% of its original concentration, will show greater steam economy than a plant which is required to reduce it to only 25%. The accompanying table gives some calculated figures based on, and confirmed by, results from average practice, which show the steam economy to be expected.

If the efficiency of a deodorizing unit can be increased by the use of steam stitching, with or without further stages, and the heat in the resulting low steam flow is recovered for useful purposes by surface condensing or other means, then the steam economy of the process will be very high.

Major portion of the steam will

then be used to heat the cream—which can, for example, enter a system at 70 deg. F. and leave at 130 F. Here the steam requirement is about 0.06 lb. per lb. of cream. Most of the heat in this cream can be recovered by preheating water in a split-section cream cooler.

By these measures, the steam demand for Vacreators can be reduced from a high figure dominating the steam load in a butter factory to a considerably lower figure. Take for instance the factory in which steam stitching, as shown in lead drawing, was combined with the system shown in Fig. 4. This plant now operates on one boiler instead of two.

In New Zealand, steam-stitching units have been supplied to 60% of the Vacreator plants. And it seems likely that designs for new equipment will be based on the multiple contact principle described above.

Acknowledgments

The author wishes to acknowledge assistance with transition problems, and in trying out the new system. Credit is due H. L. Murray and W. G. Alexander, Murray Deodorisers, Ltd.; P. Halligan, manager Cheltenham Co-op. Dairy Co.; J. Stevenson, manager, Maungatapere Co-op. Dairy Co.; and R. Goodman, manager, Te Awamutu Co-op. Dairy Co.

End (Resume reading on page 77)

Form-Fit Corned Beef

—*Continued from page 94*

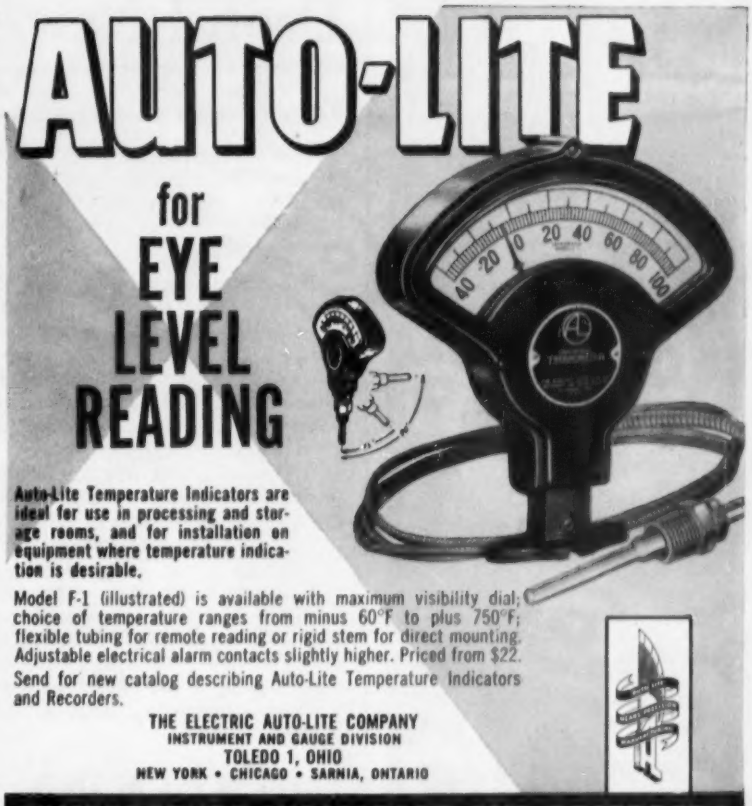
chines is approximately 1,500 lb./hr. Two operators are required for each unit. One operates the Cryovac machine. The other dips packages in hot water and cases them.

Cases have quartering corrugated dividers, and hold eight packages of corned beef. The dividers provide extra strength for shipping and for stocking in storage. Cased product is placed in 38-deg. F. storage for at least three days before shipping.

Cured in Transit

The Cryovac process differs from Patman's in that it recommends the use of a mild brine (50-60 density on salometer) and immediate packaging following draining and blooming. Cased packages will cure, at 38 deg., in three to five days—in storage or during transport to customers. In addition to saving time, this method eliminates the need for curing drums or barrels. And it frees valuable refrigerated space in which containers are stored.

End (Resume reading on page 97)



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Revolution in Distribution

THE SUPERMARKET *by M. M. Zimmerman. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1955. 340 pages. 6¼ x 9¼ in., cloth. Price:* $6.

The impact of a merchandising innovation which gained acceptance in just a few years is the subject of this comprehensive study. The beginnings of the supermarket and the conditions which led to its consumer acceptance, its growth, and its future are all covered in detail.

Organization and function of the supermarkets of today are discussed, with details on department layout, financial structure, community and public relations.

Statistical tables of operation are included. These are valuable as practical scales for the study of a food retailing structure, providing a statistical view not only of the whole, but of individual departments. Book is illustrated and indexed.

History of Fish Processing

FISH SAVING BY C. L. CUTTING. *Published by Philosophical Library, Inc., 15 E. 40th St., New York City 16. 1956. 372 pages. 5¾ x 8¾ in., cloth. Price:* $12.

Tracing technique of fish processing from ancient to modern times, the work is an interesting account of the developments in one facet of the food industry. Preservation of fish by drying, salting, smoking, canning, chilling and freezing is dealt with in its relation to the historical development of processing.

Though the author is specifically dealing with the fishing and fish-processing industry in Great Britain, chapters on freezing, fish meal, dehydration, and other processing aspects are of definite value to food processors. Book is illusrated and indexed.

Still Techniques

DISTILLATION IN PRACTICE *by Charles H. Nielsen. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1956. 133 pages. 5¼ x 5⅞ in., cloth. Price:* $3.

A series of papers originally presented in Philadelphia in 1954 under the auspices of the Philadelphia-Wilmington Section of the American Institute of Chemical Engineers and the Department of Chemical Engineering of the University of Pennsylvania, book covers all of the most recent developments in the evolution of distilling techniques. Column design, petroleum fractionation, instrumentation, operation of distillation equipment, and commercial aspects of vacuum distillation are discussed.

Editor was research supervisor at du Pont de Nemours & Co.'s engineering research laboratory. In this book he collects the knowledge and views of the leading men in the field of distillation. Aim of the symposium, as well as the book, was to provide knowledge and guidance for young engineers. Presentation of basic principles as well as encouragement in the development of new ideas make it valuable to students and beginners in food technology.

Operation of Engines

FIFTH SYMPOSIUM (INTERNATIONAL) ON COMBUSTION *By Standing Committee on Combustion Symposia of the Combustion Institute. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22, 1955. 802 pages. 7 x 10¼ in., cloth. Price:* $15.

A collection of 101 outstanding papers presented at the Fifth International Combustion Symposium in Pittsburgh in 1954, the book offers detailed and up-to-date information on efficient operation of all types of engines.

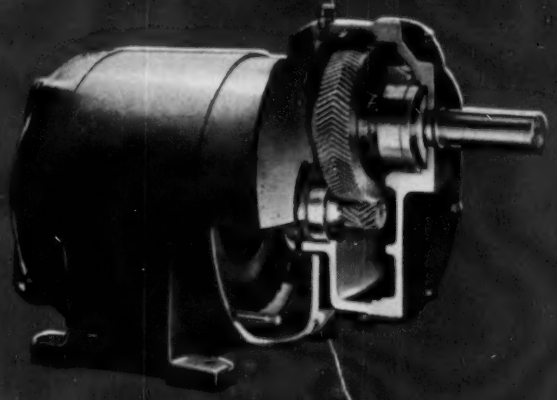
Almost half of the papers deal with kinetics of combustion reactions. Each chapter concludes with a complete list of references. Book is illustrated.

Booklets & Reports

BREAD . . . FACT BOOK CONSUMER EDUCATION. (*USDA Bulletin No.* 142). *Published by USDA, Washington 25, D. C. No charge.* Semi-technical bulletin presenting facts on bread economics and nutrition.

GETTING AND HOLDING GOOD EMPLOYERS. *Published by Chamber of Commerce of the United States, Washington, D. C. 26 pages, paper. Price:* 50¢. Discussion of economic climate effects on business costs.

DRY MILK PRODUCTS. *Published by Quartermaster Food and Container Institute for the Armed Forces, Chicago 9. 84 pages, paper.* Proceedings of a symposium on chemical aspects, manufacturing, processing and dispersability.



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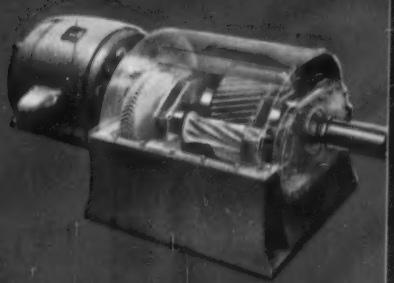

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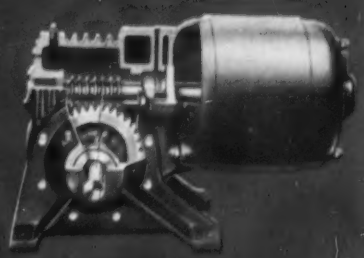

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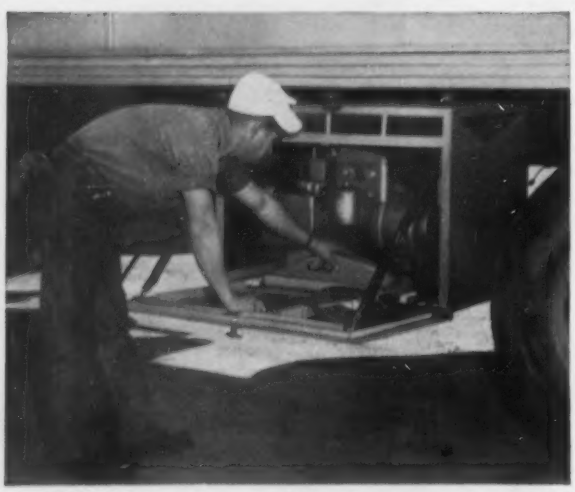

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FDA Cancels Dye Ban

Florida orange growers have won a last-minute reprieve from an FDA order, which would have banned use of FD&C Red 32 for coloring fruit (FE Dec. '55, p. 195).

In Congressional hearings, called at behest of Florida and Texas citrus men, FDA said it would give the industry three years to prove the coal tar dye harmless for human consumption, or to develop and prove a new non-toxic color.

Hoffmann-La Roche, Inc., has developed such a new dye, but has indicated that it needs two years in which to perform toxicological tests and start production.

Candy Bar Weight to Rise

New cuts in cocoa bean prices may considerably swell the size of 5-cent candy bars, which have been shrinking since World War II.

The price break, which has now reached a five-year low, has already led some manufacturers to up weights ½ oz.

They are reluctant, however, to make further increases in mid-season. And most want to be certain of price movements before making changes that require clearing inventories, resetting machines, and using new molds.

Plans to Pipe Sugar Cane

Feasibility of piping sugar cane from fields to plant will soon be put to the test by Hawaiian Commercial & Sugar Co., Maui, Hawaii.

Planned is a 1,000-ft. water line. HC&S feels that if plan is successful, tremendous savings will be realized in the mills by having clean cane to grind. Preliminary research indicates that sugar loss in transit will be low.

GM Starts Radiation Study

Receipt of 4,000 curies of Cobalt 60 at General Mills research laboratories signals start of extensive radiation studies at the company, announces L. F. Borchardt, GM physical research director.

A broad program, scheduled for the new facility, aims at reducing physical and flavor changes in products during processing and storage.

Speakers at the Canners' Convention Tackle Industry-Wide Problems

Problems of interest to the entire food industry received close attention at the recent National Canners Assn. and Canning Machinery & Supplies Assn. annual meeting in Atlantic City.

Discussions ranged from the ultimate effect of atomic radiation on present processing methods, and merchandising of private packer's labels, to instrumentation, insecticides, warehousing, and agriculture. Following are spotlight briefs:

Irradiation: Commenting on future applications of radiation sterilization, Col. W. D. Jackson, Office of the Quartermaster General, Dept. of the Army, said, "The irradiation process will not significantly disrupt the (present) food processing line."

Product preparation will be handled normally, and foods will ordinarily be packaged prior to being subjected to ionizing rays, he continued. "A rather small area will be required for beta and gamma sources, which would replace retorts and freezing units now in use."

Packer's Labels: "If the relatively un-promoted packer's label is to survive in the battle with national and chain brands, then small packers must band together in groups under a common label," stated A. J. Becker, of Foote, Cone & Belding.

By assigning production quotas to each member and setting aside funds for local and regional advertising, they may halt the "gigantic squeeze" that now threatens the very existence of this independent brand, he concluded.

Instrumentation: "The food industry will inevitably proceed to the 'pushbutton' factory", declared J. B. Anderson, H. J. Heinz Co. But, he added, conditions exist where 75% of the possible savings can be garnered with only half the investment required for total automatic control. And here it would be impractical to double the investment outlay for a gain of only 25% savings.

Insecticides: Flooded with new pesticides, food processors face a serious problem of detecting residues on raw materials. However, NCA Laboratories believe they have an answer to this in their version of a fly bioassay method, according to John T. Knowles, chairman, NCA Scientific Research Committee.

Warehousing: "There is a growing trend for buyers to anticipate their needs on a short-term basis. Add this factor to the sharp increases in freight rates, and efficient warehousing becomes a matter of survival," declared P. Steele Labagh, California Packing Corp.

He cited moves to put warehouse management under top distribution executives as forward thinking. And he urged processors to seize upon new materials handling aids—such as automatic palletizers and clamp-type lift trucks—to bridge the difference between proficient and marginal warehouse operation.

Agriculture: Ezra T. Benson, Secretary of Agriculture, in discussing plans for farm relief, challenged the food processing industry to step up its support of basic agriculture and marketing research to help solve surplus-product problems.

"Australia's Biggest Kitchen"

Giant food plant, recently opened by H. J. Heinz Pty. Ltd. near Melbourne, Australia, reportedly has the largest spaghetti machine and processing kitchen ever installed in that country. Plant and office buildings cover a 70-acre tract and cost over $11,000,000.

Tests New Nuclear Moisture Gage For Continuous Food Line Applications

Rapid in-line measurement of food-product moisture by means of the NMR (nuclear magnetic resonance) device may soon become a reality as a result of experiments now being made by Corn Products Refining Co., Argo, Ill.

The principle has already been successfully applied in testing starches, sugar, dextrins, glutens, and other products in the laboratory.

And Corn Products has found that the NMR apparatus (FE Aug. '55, p. 80) gives data fully as accurate as those obtained with the conventional vacuum oven—and in less than a minute, rather than hours as with the vacuum method.

The company is applying the device to lab control of corn wet-milling operations. Next step will be to expand the technique to measure moisture content on a continuous basis right on the production line.

Southwest Research Institute, which cooperated with USDA's Western Utilization Research Branch in developing the tester, has already obtained encouraging results using the unit for in-line control. And there appears to be wide food industry application for NMR—employing its electrical signal to regulate dryers, blenders, and similar equipment.

Heart of the nuclear magnetic resonance apparatus is an oscillator that supplies radio-frequency energy to the test sample through a coil located between poles of a magnet. Unit also has a detector, amplifier, and recorder.

Method of measurement is unique, for NMR gages moisture through the nuclear properties of the hydrogen atom—not the water molecule.

Profiteering By Food Men Denied By GMA's Willis

The charge that "middlemen" have profiteered from the drop in farm prices, and have not passed food savings on to the consumer is sharply denied by Paul S. Willis, president, Grocery Manufacturers of America.

He says, "Since 1952, peak year of retail food prices, two-thirds of the drop in raw farm food prices has been passed to consumers."

"During this time," he continues, "average combined rate of net profits for manufacturers and distributors has remained the same. There has been no increase."

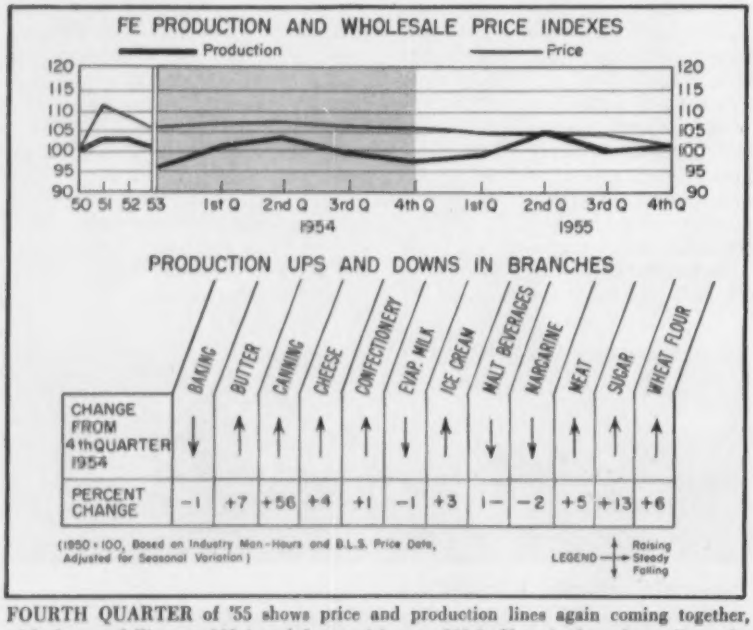
In fact, profits today are about 3c. of the consumer's food dollar, compared to 6c. in 1939. This lower profit rate has offset, to some extent, increased labor and equipment costs.

"Had there not been a considerable increase in food industry efficiency due to heavy investment in plants, equipment, and better methods," declares President Willis, "Rises in wage rates would have forced a much greater increase in the price spread."

Pushes Poultry Check Bill

Compulsory continuous inspection of poultry packing houses is called for in a bill recently introduced in Congress by Rep. J. Percy Priest.

The measure (H.R. 8599) would amend present Food and Drug Act, and set up a poultry inspection service to prohibit interstate movement of "unsound, unhealthful, diseased, unwholesome, or adulterated poultry or poultry products."



FOURTH QUARTER of '55 shows price and production lines again coming together, with former falling to 101.4 and latter rising to 101.0. Note in branch readings the strong canning figure, which was already plus-38 in 3rd quarter.

IFT Boosts Food Career

Rewards of a career in food technology are set forth in a challenging new booklet sponsored by the Institute of Food Technologists. Distribution of 64,000 copies—to high school science teachers, principals, and students—is completed. IFT is asking firms to contribute to the worthwhile public information project.

Cautions on Dietary Labels

Food manufacturers were cautioned by George P. Larrick, FDA Commissioner, following a recent seizure of diatetic candies for alleged mislabeling of salt and sugar contents.

Labels bore the statements "No Salt Added" and "No Sugar Added", yet foods are said to have contained a substantial sodium and calorie content.

"These statements could seriously mislead heart and diabetic patients," said Commissioner Larrick. "Under the regulations such foods must be labeled with the number of milligrams of sodium per 100 g. of food and per average serving."

He noted that such violations have been rare, and credited manufacturers for their efforts to meet the law.

AMI Counters Benson Plea On Meat Costs, Profits

Calling on meat packers to tighten costs and keep profit margins in line, Ezra T. Benson, Secretary of Agriculture, has revealed concern over the recent drop in hog prices. At the same time, he says, processing and distributing charges have remained constant or even increased.

In quick reply, the American Meat Institute heartily endorsed Secretary Benson's objectives. But, it pointed out that meat packer's operating expenses have advanced 34% between 1949 and 1954.

On the score of profits, AMI says "Packer's profits are notoriously low—too low in fact to provide adequate funds for plant improvement, modernization, research, and promotion. In 1955, earnings averaged less than a penny per dollar of sales."

Hors d'Oeuvres

▶ **"The Food Economy of the New England Indians, 1605-75," has just come off the press. We hasten to tell you in case you would like to look backward instead of forward for a change.**

▶ Only 10 percent of the Indians' diet was meat, and they had no dairy products nor sweets. That's enough to make anyone savage.

▶ **Flav-r-Straws claimed to give you chocolate or strawberry flavored milk when used to drink plain milk have been invented. You must admit it's ingenious.**

▶ Addition of antibiotics to feed has significantly improved the health of hogs and other animals. Could it be that pigs eat better than people?

▶ **Many large plants are using automatic vending machines to do a complete employee feeding job. Not even a pretty cashier to pep-up the work-weary soul.**

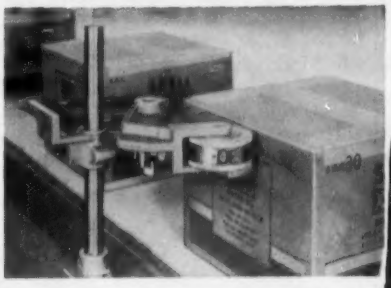
▶ Bacon in rolls like Scotch tape, off which you peel strips for the frying pan, has been suggested.—Sort of a packaging strip-tease.

▶ **Then there's an idea that eggs be repackaged in synthetic shells rather than the impractical protection furnished by the hen.—Rubber maybe, so they would bounce if dropped.**

▶ Pelletized flour which would not be dusty, and packaged in a shaker container for messless mixing, is another concept. This kind of cocktail cooking would be fun for father.

▶ **These packaging thought stimulators came from J. G. Balmer at an Alcoa breakfast where dreaming seemed appropriate. But today's dreams are tomorrow's progress.**

Low-cost marking attachment pays for itself in weeks... saves thousands of $ every year



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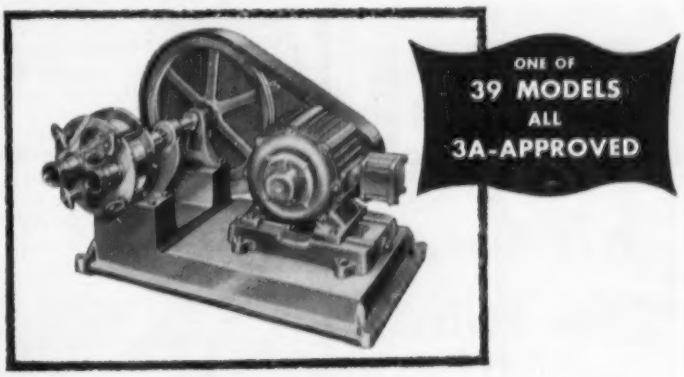

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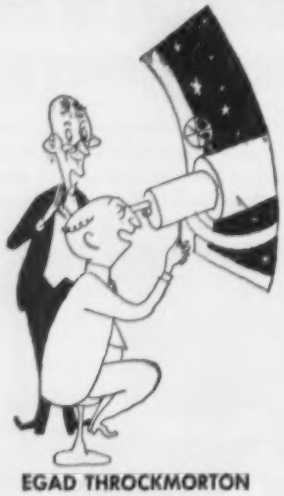

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Aseptic Glass Packing Undergoes Tests

A new process for aseptic packing of juices, concentrates, liquids, and purees in glass containers will be tested at the U. of California, reveals Emil M. Mrak, chairman, food tech. dept.

Not yet in commercial use, method will be perfected on special experimental equipment loaned to the University by the Glass Container Manufacturers Institute.

Similar to present machines used for aseptic canning of semi-liquids in tin, the latest unit sterilizes and cools jars, caps, and product separately. Food is then introduced into container, which is capped and moved out of unit automatically.

The new machine, says Dr. Mrak, will tie in with several new types of evaporators—now being tested at the Davis, Calif., food processing laboratory—for manufacturing and packing juices and concentrates.

Canners Elect Officers

Chosen as president of the National Canners Assn. for 1956 is William U. Hudson, vice-president in charge of research, Gerber Products Co., Oakland, Calif.

A. Edward Brown, v.-p. and treasurer of Michigan Fruit Canners, Inc., Benton Harbor, Mich. was selected as vice-president. Continuing in the office of executive secretary-treasurer is Carlos Campbell.

Kaiser to Make Containers

With two plants, one on the West Coast and the other in the Midwest, Kaiser Aluminum & Chemical Corp. is entering the aluminum food container business.

The West Coast plant is being acquired through the purchase of Foil Kraft, Inc., of Los Angeles, producer of aluminum containers for the frozen food industry. The Midwest plant will be a new facility—costing more than a million dollars—at Wanatah, Ind.

Frozen Food Nutritives

Intensive research has established the precise vitamin and mineral content of 51 frozen vegetables, fruits, and juices, reveals Dr. L. J. Teply, director of projects, Wisconsin Alumni Research Foundation.

The project, which enlisted the aid of 150 freezers to supply the necessary 27,562 samples, was started in 1953 by the National Assn. of Frozen Food Packers.

Reported were values for eight vitamins, six minerals, and seven other components, such as calories, fats, and proteins.

Dr. Teply disclosed that the seven highest ranking foods in overall vitamin and mineral content are: Asparagus, broccoli, collard greens, orange juice, peas, spinach, and strawberries.

Food Processors Join QMC In Rayed Potato Tests

Five potato products manufacturers will join with Army Quartermaster Corps and AMF Atomics, Inc. in evaluating gamma-radiated processing potatoes.

Treatment, which is expected to greatly lengthen storage life and thus insure a steady, year-around supply of tubers to processors, will be conducted at AEC's reactor in Idaho Falls, Idaho. Several varieties of Maine and Idaho potatos will be irradiated, then turned into potato chips, frozen French fries, and dehydrated, canned, and pre-peeled products.

Cooperating companies are: J. R. Simplot Co., Boise, Idaho; Miller's Pre-Pared Potato Co., Chicago; Arrowhead Production Co., Inc., Antigo, Wis.; Tater State Potato Co., Washburn, Maine; and H. C. Baxter & Bros. Co., Corinna, Maine.

Food Society Elects

Dr. William B. Esselen, U. of Massachusetts, has been selected president of Phi Tau Sigma—the national honorary food science society.

Other officers, recently elected at the group's first meeting in Boston, are Dr. Carl S. Pederson, Cornell U., vice-president, and Dr. Jean Caul, Arthur D. Little, Inc., secretary-treasurer.

Fights Polio With Peanuts

Fisher Nut Co., St. Paul, Minn. joins the campaign against crippling disease by supplying the National Foundation for Infantile Paralysis with these eye-catching bags of peanuts at below-cost prices. Foundation sells product to raise funds for the March of Dimes. Over 3,000,000 packages have been sold to date.

Canning Baby Now A Giant

Pioneered in 1935, canned beer and ale has now become an 8-billion-can-per-year business, using fully 20% of all tins made in the U. S. To commemorate this rise, the 50-billionth beer can was recently presented to Sinclair Weeks, Secretary of Commerce (right), by Edward V. Lahey, president, U. S. Brewers Foundation (center), and T. E. Alwyn, v.-p., American Can Co.

Food Science Fellowship

Formation of a new food technology fellowship for graduate studies in the field of food refrigeration, is announced by Refrigeration Research Foundation, Inc., Colorado Springs.

This latest student aid will be called the Samuel Cate Prescott Fellowship in honor of the Foundation's chairman of the board of governors, who is also emeritus dean of science at Massachusetts Institute of Technology.

Reports Rayed-Food Study

Large-scale testing of radiated foods is underway at the Argonne National Laboratory, according to the U.S. Atomic Energy Commission in its semiannual report to Congress.

The facility, which is available for use by non-AEC organizations, employs a 1,000,000-roentgen-per-hour radiation source. It can handle 60 No. 2 cans of food materials at a single time.

Correction

Through error, the article "4-Way Insect Control" (FE Feb.) described a recommended insecticide as "3% methoxychlor and 5% lindane" (p. 48, col. 2 and 3, under subhead "1, Vs. Crawling Insects"). Lindane figures should have read 0.5%.

Also, toxicity of this insecticide was put at 1/60th that of chlordane. Correct figure is 1/160th.

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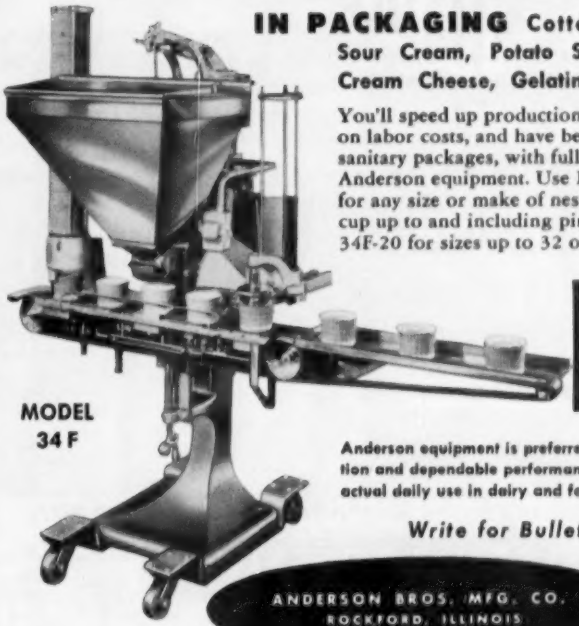

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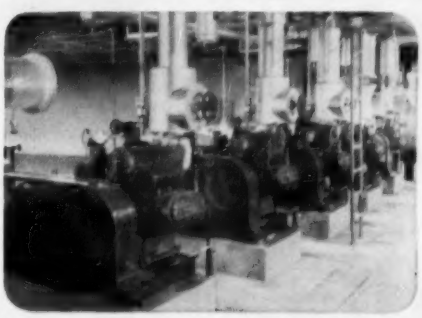

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DS-2

Briefly . . .

● GLASS CONTAINERS hit an all-time peak in '55, according to Glass Container Manufacturers Institute, Inc., New York City. Shipments of glass for food packaging totaled 7.8-billion units, up 8% from '54 figures (7.2 billion).

● CALIFORNIA WINE shipments in '55 totalled 117,999,639 gal., a scant 0.76% gain over '54, says the Wine Institute, San Francisco.

● MATERIALS HANDLING will now gain new impetus with completion of a development center at Battle Creek, Mich., states Clark Equipment Co. Facility has indoor and outdoor proving grounds and test mock-ups for industry-wide projects.

● SHORT COURSE in food technology will be held Mar. 16 and 17 at the U. of Missouri. Lectures are to cover fruits and vegetables, meats, poultry, dairy, and cereal products.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

Orange juice, dehydrated, AMS establishment of U. S. Grade Standards, *F.R.*, Jan. 27, p. 604.

Canned pumpkin and canned squash, AMS establishment of U. S. Grade Standards, *F.R.*, Feb. 7, p. 829.

Orange juice, canned, AMS establishment of U. S. Grade Standards, *F.R.*, Feb. 11, p. 983.

On apples, broccoli, brussels sprouts, cabbage, cauliflower, muskmelons, oranges, pears, potatoes, strawberries, walnuts, and beans, tolerances of Systox, *F.R.*, Jan. 14, p. 301.

On barley, corn, rice, rye, and wheat, tolerances of calcium cyanide, *F.R.*, Jan. 26, p. 581.

On lima beans, strawberries, asparagus, cauliflower, sweetpotatoes, carrots, and parsnips, tolerances of ethylene dibromide, *F.R.*, Feb. 3, p. 768.

On corn, wheat, fat of meat from cattle, goats, sheeps, swine, fat of poultry, and milk, proposed tolerances of Lindane, *F.R.*, Feb. 10, p. 975.

On carrots, peaches, and radishes, proposed tolerances of Heptachlor, *F.R.*, Feb. 11, p. 995.

Partially creamed cottage cheese, FDA Standard of Identity, *F.R.*, Jan. 20, p. 430. Postponement of hearings, *F.R.*, Feb. 7, p. 846.

Cheddar cheese, cheddar cheese for manufacturing, washed curd cheese, soaked curd cheese, washed curd cheese for manufacturing, Colby cheese,

Colby cheese for manufacturing, granular cheese, stirred curd cheese, granular cheese for manufacturing, Swiss cheese, Emmentaler cheese, Swiss cheese for manufacturing, Gruyere cheese, brick cheese, brick cheese for manufacturing, Muenster cheese, Monterey jack cheese, high-moisture jack cheese, Provolone cheese, pasta filate cheese, Caciocavallo Siciliane cheese, Asiago fresh cheese, Asiago soft cheese, Asiago medium cheese, Asiago old cheese, semisoft cheese, semisoft part-skin cheese, pasteurized process cheese, pasteurized blended cheese, pasteurized process cheese with fruits, vegetables, or meats, pasteurized blended cheese, pasteurized process pimento cheese, pasteurized blended cheese with fruits, vegetables, or meats, pasteurized process cheese food, pasteurized process cheese food with fruits, vegetables or meats, pasteurized process cheese spread, cold-pack cheese, club cheese food, club cheese, comminuted cheese, cold-pack cheese food, and cold-pack cheese food with fruits, vegetables, or meats, FDA Standards of Identity, proposed amendments, F.R., Jan. 24, p. 541.

Canned pineapples and canned *pineapple juice,* FDA Standards of Identity, F.R., Feb. 10, p. 930.

Schedule of Events

March

18–21—National Peanut Council; Jung Hotel, New Orleans.

22–23—American Meat Institute, research conference; U. of Chicago.

April

9–12—American Management Assn., national packaging exposition; Convention Hall, Atlantic City.

9–13—American Warehousemen's Assn., annual convention; Statler Hotel, Los Angeles.

14–17—National Fisheries Institute, annual convention & exposition; Seville Hotel, Miami Beach, Fla.

16–20—Plant Layout Technical Workshop, planning techniques, (second session 23-27); Greater Pittsburgh Airport Hotel, Pittsburgh.

18–19—Armour Research Foundation, industrial research conference; Sherman Hotel, Chicago.

23–25—American Oil Chemists' Society, spring meeting; Shamrock Hotel, Houston, Tex.

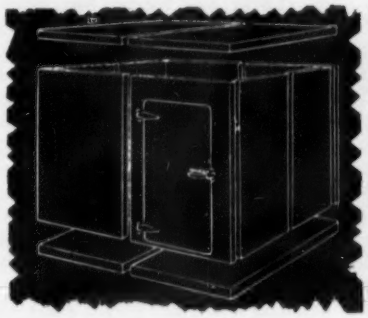
23–26—3-A Sanitary Standards Committees for Dairy Equipment, semi-annual meeting; Kenwood Golf & Country Club, Bethesda, Md.

26–27—Pennsylvania Manufacturing Confectioners' Assn., annual production conference; Franklin & Marshall College, Lancaster, Pa.

26–27—American Institute of Electrical Engineers, conference on recording & controlling instruments; Bradford Hotel, Boston.

27–28—National Pretzel Institute, spring convention; Bedford Springs Hotel, Bedford, Pa.

FREEZER AND COOLER THAT ARE EXPANDABLE PORTABLE



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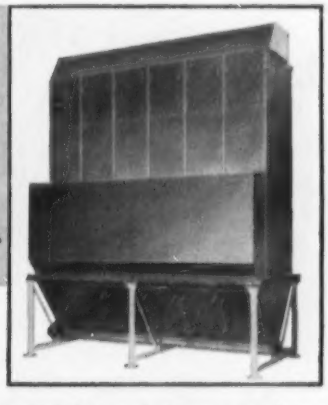

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Chelating Additives

—Continued from page 49

widely used for this purpose and Government regulations permit as much as 3% added phosphate.

However, when sodium metaphosphate is used as a cheese-melting salt, it appears that more is involved than the mere complexing of calcium. For cheese thus prepared does not melt readily, hence is not suited for rarebits, toasted cheese sandwiches, or cheeseburgers.

This characteristic limits the use of sodium metaphosphate to cheeses intended for novelty meat loaves. Here, it is desirable that cheese portions retain their shape during heat processing. In this case, properties of the cheese apparently result from a reaction between casein and phosphate, as well as between calcium and phosphate.

▶ **Ice cream** presents a somewhat similar situation. Sodium metaphosphate, by its action on calcium and protein, gives a product with improved viscosity and whipping characteristics.

▶ **Cured meats** has been a relatively recent application of polyphosphates (FE Oct. '55, p. 84). They enhance cured color and improve color stability and moisture retention of product.

▶ **Canned fish**, especially shell fish such as crab, shrimp, and lobster, occasionally develop crystals of magnesium ammonium phosphate known as struvite. These crystals form during storage from constituents normally present in fish tissue. But they so closely resemble glass splinters that several liability suits have resulted.

Gorton-Pew patented a process for adding a small percentage of sodium metaphosphate to the canned product and this prevented crystallization of struvite on prolonged storage.

▶ **Antioxidant properties** are also attributed to sodium metaphosphate, believed due to its sequestering action on metal ions that normally catalyze oxidation. Further, it exhibits pronounced synergistic action when used with fat-oxidation inhibitors.

Lard-rancidity studies indicate that while control samples turn rancid in 2½-4 days, addition of metaphosphate alone increases the keeping time to 7-17 days. When the lard contained both metaphosphate and an inhibitor, such as butylated hydroxyanisol, rancidity did not occur in 93 days.

▶ **Sequestration of iron** is a property of phosphates that helped to prevent darkening of hominy during processing. The difficulty was tracted to a high level of dissolved iron in the process water. It was remedied by a small amount of metaphosphate which tied up the iron.

Formerly, iron was being precipitated during the alkaline process, thus darkening the hominy. Similarly, iron dissolved in water combines with tannin present in some foods to give undesirable darkening or discoloration.

Controlling of scale, corrosion, and discoloration in water supplies is an obvious, but sometimes overlooked, function of metaphosphate. While the addition of chelating agent is seldom made to improve the water's potability, it sometimes does. Application is at very low levels, perhaps 1 ppm., so the reaction cannot be considered to be one of sequestration.

Potassium phosphates are also commercially available, but have only limited use. In most cases, they show no advantage over the sodium salts. However, a fascinating characteristic of potassium metaphosphate is its ability to form very viscous solutions or gums under certain conditions.

The above feature is an abstract of a talk given by the author at a recent meeting of the New York Section of the Institute of Food Technologists. End (Resume reading on page 50)

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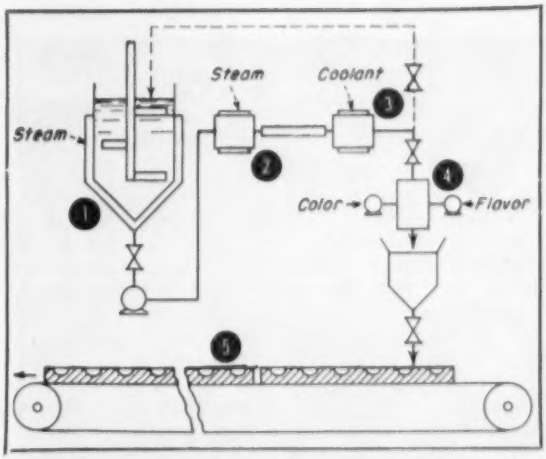

Starch-Cooking Line Produces Gelled Confections

A slurry of carbohydrates (15-25% moisture) containing substantial starch is formed in kettle (1). Mix is heated under pressure to avoid boiling and held (2) long enough to cook the starch. Then, it is rapidly cooled (3) and admixed with color and flavor (4). Product is formed into confection pieces on conveyor (5).—*J. P. Bolanowski, Jefferson, Ind., to National Cylinder Gas Co., Chicago. No.* 2,726,960. *Dec.* 13, 1955.

PRODUCTS

Margarine Improved for Frying by Addition of Alcohol-Insoluble Vegetable Lecithins—P. L. Julian, Maywood, H. T. Iveson, Berwyn and M. L. Mc Clelland, Harvard, Ill., to Glidden Co., Cleveland. No. 2,724,649. Nov. 22, 1955.

Fish Product by Freezing Pieces Into Large Unit, Cutting, Battering, Breading, Frying, Packaging, Freezing—W. F. Hampton and E. J. Maher, Reading, Mass., to General Foods Corp., New York City. No. 2,724,651. Nov. 22, 1955.

Non-Toxic Insecticide for Use on Meat Comprising Pyrethrins, Piperonyl Butoxide, Sodium Nitrate—F. L. Todd, Jr., Martin, Tenn. No. 2,724,653. Nov. 22, 1955.

Stabilized Wheat Base of Bran-Containing Wheat Cereal, Wheat Germ, Water—J. Cryns, Chicago. No. 2,725,300. Nov. 29, 1955.

Frozen Pie-Crust Dough Consisting of Soft, Hard Flours, Shortening, Salt, Water—B. H. Armstrong, Hohenwald, Tenn. No. 2,726,156. Dec. 6, 1955.

Hard Butter by Treating Fatty-Acid Triglycerides With Low-Temperature Rearrangement Catalyst—W. M. Cochran, Highland Park, and R. F. Mc Gee, Barrington, Ill., to Glidden Co., Cleveland. No. 2,726,158. Dec. 6, 1955.

PROCESSES

Reducing Boiler Scale by Adding to Boiler Water 0.5-2.0 Gr. per Gal. of Copolymers of Maleic Anhydrides and Monoethylenic Compounds—C. E. Johnson, Westchester, Ill., to National Aluminate Corp., Chicago. No. 2,723,956. Nov. 15, 1955.

Processing Citrus Pulp by Treating With Anhydrous Ammonia, Extracting, Separating—E. M. Burdick, Weslaco, Tex. No. 2,724,648. Nov. 22.

Concentrating Orange Juice by Separating Into Pulp, Liquid Fractions, Pasteurizing and Cleaning Pulp, Evaporating Liquids, Mixing—J. A. Brent, W. W. Brown, and W. R. Roy, Orlando, Fla., to Minute Maid Corp., New York City. No. 2,724,652. Nov. 22, 1955.

Hydrogenating Fatty Oils by Saturating With Gas, Passing Over Electrically Conductive Catalyst—R. P. Dunmire, Orange Village, Ohio. No. 2,724,689. Nov. 22, 1955.

Filtering Fruit Waste by Adding Ground Coconut Meal as Filter Aids—W. A. Forbes,

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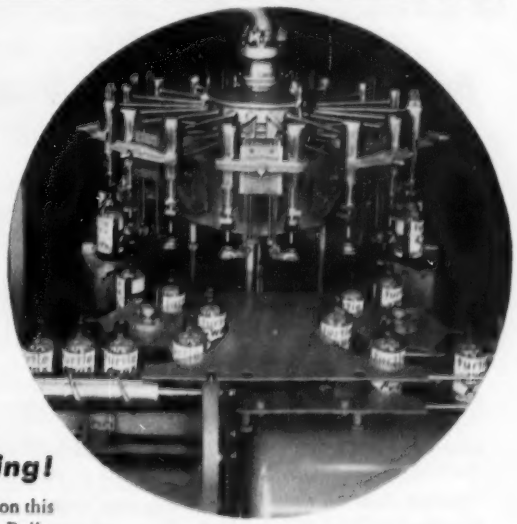

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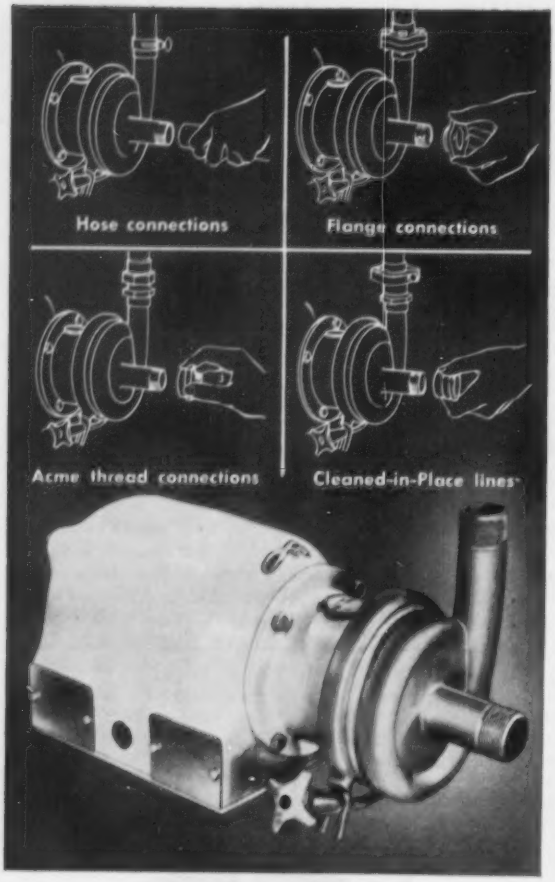

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Napa, Calif., to R. P. Forbes. No. 2,725,146. Nov. 29, 1955.

Ageing Green Coffee Artificially by Dehydrating Beans, Heating, Cooling, Mixing With Hydrogen Peroxide—C. Platel, Calais, L. Delahousse, Pond du Leu, and C. Lafitte, Bordeaux, France. No. 2,725,299. Nov. 29, 1955.

Recovering Soluble Starch From Waste Water by Precipitating With Calcium Compound, Agitating, Separating—C. E. Smith and L. P. Hayes, to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,725,313. Nov. 29, 1955.

Preparing Sea Clams for Frying by Removing Shell, Separating Foot Portion, Slicing—S. N. Soffron, Rowley, and P. N., G. N., and T. Soffron, Ipswich, Mass. No. 2,726,157. Dec. 6, 1955.

Retarding Vaselation Streaks in Unhydrogenated Vegetable Shortening by Reducing Peroxide Value of Oils to Zero in Vacuum, Cooling, Adding Propyl Gallate and Citric Acid, Injecting Steam—W. H. Newby and H. L. Guidry to Cotton Products Co., Opelousas, La. No. 2,726,159. Dec. 6, 1955.

Extracting Cottonseed Oil by Cooking Flakes, Cooling by Evaporation, Compressing, Adding Solvent, Filtering—E. A. Gastrock, H. L. E. Vix, E. L. D'Aquin, J. J. Spadaro, and A. V. Graci, Jr., New Orleans, to USA. No. 2,726,253. Dec. 6, 1955.

EQUIPMENT

Automatic Fumigator Including Open-Ended Cylinder, Detachable Closure, Inner Fumigant-Storing Container, Absorbent Wick, Conduit Connection—W. A. Hipp, Haddonfield, N. J., and M. B. Jacobson, Philadelphia, to C. Schmitz & Sons, Inc., Philadelphia. No. 2,722,452. Nov. 1.

Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Fish-Handling Pump Having Flexible Suction Line, Nozzle With Open-End Rectangular Inlet, Upwardly Curving Side Walls—E. M. Tholl to Yeomans Bros. Co., Chicago. No. 2,722,461. Nov. 1, 1955.

Fish-Filleting Unit Employing Upper and Lower Cooperating Conveyors, Rows of Knife Blades, Spacing Adjustment, Fish-Aligning Means—C. M. Savrda, Brightwaters, N. Y., to International Fisheries Machinery Co., New York City. No. 2,722,711. Nov. 8, 1955.

Shirring Machine for Thin-Walled Cellulosic Sausage Casings Comprising Mandrel, Shirring Head and Dogs, Support, Guide and Drive Means—J. R. Blizzard and J. W. Firth, Chicago, and L. M. Wynkoop, Lyons, Ill., to Tee-Pak, Inc. No. 2,722,714. Nov. 8, 1955.

Cookie-Sandwich Machine Having Horizontal Conveyor, Longitudinally Spaced Pins, Upper Tracks—A. A. Knee to Lance, Inc., Charlotte, N. C. No. 2,722,900. Nov. 8, 1955.

Screw Conveyor Employing Cylindrical Tube, Inner Rotatable Shaft, Continuous Helical Fin—H. Nicolai, Chicago, and H. F. Kolze, Forest Park, Ill., to Vastine Engineering Co., Forest Park. No. 2,723,021. Nov. 8, 1955.

Sanitary Bearing and Shaft With Coaxial Sleeve, Annular Collar, Slidable Polyamide-Resin Bushing, Stop, Thrust, and Sealing Means—A. J. Collins, Oakland, Calif. No. 2,723,110. Nov. 8, 1955.

Apparatus for Internal Cleaning of Dressed Poultry—G. F. Smith, Williamsville, and F. E. Lugsdin, E. Amherst, N. Y. No. 2,723,421. Nov. 15, 1955.

Mill Comprising Cooperating Stationary and Inner Rotatable Members, Annular Milling Zone, Slit-Like Feed Passage—D. E. Marshall, Edina, Minn., to Micro Processing Equipment, Inc., Des Plaines, Ill. No. 2,723,422. Nov. 15, 1955.

Dehydrofreezer Consisting of Tank, Propeller, Tubular Refrigeration Means, Scrapers—E. P. Wenzelberger to Commonwealth Engineering Co. of Ohio, Dayton. No. 2,723,539. Nov. 15, 1955.

Humidity-Measuring Probe Including Elongated Body, Hollow Tip, Sensing Element, Flexible Bulb, Conduit—C. E. Ohlheiser to American Instrument Co., Silver Spring, Md. No. 2,723,557. Nov. 15, 1955.

Gas-Charging Machine Employing Hollow Piercing Member, Orifice, Container Support, Gas Supply—N. E. Spiess, Jr., Oakdale, L. C. Widdoes,

Bohemia, and K. R. Weaver, W. Scegville, N. Y., to National Dairy Research Laboratories, Oakdale, N. Y. No. 2,723,790. Nov. 15, 1955.

Centrifuge Consisting of Rotor With Opening in Peripheral Wall, Metering Means for Heavy Phase—L. P. Sharples, Bryn Mawr, Pa., to Sharples Corp. No. 2,723,799. Nov. 15, 1955.

Pallet Cleaner With Chipping Roll, Movable Supports, Vibrator, Pallet-Advancing and Guide Means—C. Beals, Springfield, Ohio. No. 2,724,137. Nov. 22, 1955.

Cream Tester Employing Liquid-Receiving Receptacle Having Restricted-Flow Bottom Outlet, Fluid-Pressure Means, Filter—W. N. Kaiser, Columbus, Ohio. No. 2,724,263. Nov. 22, 1955.

Vegetable Press Comprising Rollers, Arcuate Guide Plate, Feed Zone, Oil-Discharge Sections—J. Hetzler, Semarang, Indonesia. No. 2,724,327. Nov. 22, 1955.

Meat-Hook Stabilizer Consisting of Bracket Fixed to Overhead Pulley Rail, Pivotal Bar, Clamp—D. L. Anderson and P. F. Shaffer, Miami Springs, Fla., to USA. No. 2,724,342. Nov. 22, 1955.

Macaroni Cutter Having Opposed Knife Edges, Conveyors for Feeding and Pulling Sticks Between Cutter, Tubular Guide Means—L. L. Rerucha to Cornhusker Machines Co., Lincoln, Neb. No. 2,274,350. Nov. 22, 1955.

Cookie Machine Comprising Endless Chain With Baking Trays, Guide and Tilting Means, Dislodging Knife—A. A. Kottmann, Davenport, to F. C. Wallace, Bettendorf, Iowa. No. 2,724,351. Nov. 22, 1955.

Egg-Washer With Endless Conveyor, Article-Holding Fingers, Rotary Brushes, Tank—G. T. Church, Chertsey, England. No. 2,724,846. Nov. 29, 1955.

Flake-Ice Machine Employing Water Tank, Revolving Drum, Refrigerating Means, Ice Remover, Ice-Storage Chamber, Automatic Controls—T. Kattis, Bedford, Ind. No. 2,724,949. Nov. 29, 1955.

Dough Molder Comprising Belt Between Molding Board and Table, Horizontally Pivoted Hinged Support, Vertically Adjustable Tapering Connections—S. Austin to J. Rosenthal, Hartford, Conn. No. 2,725,-019. Nov. 29, 1955.

Can Washer Consisting of Reciprocating Feeder for Inverted Cans, Rotatable Spray Nozzle—W. J. Tamminga, Goshen, N. Y. No. 2,725,064. Nov. 29, 1955.

Suction Filter Having Rotatable Drum, Suction Chamber, Fall-Tube, Conduits, Valve Means—A. Mylius, Sogn, Norway, to Aktiebolaget Kamyr, Karlstad, Sweden. No. 2,725,145. Nov. 29, 1955.

Chocolate-Tempering Unit Including Inlet, Intermediate, and Outlet Chambers, Communicating Tubes, Heating Space, Flow and Temperature Control Means—A. Hansen, Herlev, to Mikrovaerk A/S, Soborg, Denmark. No. 2,725,-217. Nov. 29, 1955.

Sausage-Casing Remover With Conveyor, Pivotal Lever, Casing Separator, Knife, Skid Member, Discharge Nozzle—T. B. Cline and R. J. Tepe, Sycamore Twsp., Ohio. No. 2,725,591. Dec. 6, 1955.

PACKAGING

High-Speed Wrapper With Conveyor, First, Second Transfer Zones, Continuously Rotating Transfer and Wrapping Wheels, Reciprocating Lever—C. J. Malhiot, Oak Park, Ill., to F. B. Redington Co., Chicago. No. 2,723,516. Nov. 15, 1955.

Apparatus for Detecting and Ejecting Slack-Filled Cans—J. Simpson, Elmhurst, Ill., to Continental Can Co., New York City. No. 2,723,748. Nov. 15, 1955.

Label Applicator Employing Suction Transfer Device, Open-Face Channels, Actuating Means—T. W. von Hofe, Bound Brook, and E. K. Wolff, Palisades Park, to New Jersey Machine Corp., Hoboken. No. 2,723,775. Nov. 15, 1955.

Bag-Exhausting Unit Comprising Table, Resilient Pads, Nozzles, Vacuum Pump—E. M. Schild, Bayside, N. Y. No. 2,723,789. Nov. 15, 1955.

Multi-Color Labeler Having Rotatable Bottle Support, Stop, Fluid Drive, Color Screen, Operating Bar—Z. E. Lucas to Knox Glass Bottle Co., Jackson, Miss. No. 2,724,329. Nov. 22, 1955.

Glue Applicator for Box-Making Machine—E. L. Bivans, Los Angeles and H. R. Lobdell, Glendale, Calif., to E. L. Bivans, Inc., Los Angeles. No. 2,724,364. Nov. 22, 1955.

Frozen-Pop Package Consisting of Paper Tray With Inclined End Walls Forming Compartments, Tear Lines, Adhesively Connected Side Walls, Slit Flap—P. Schenk, Huntington, N. Y. No. 2,724,539. Nov. 22, 1955.

Collapsible Fruit Carton Employing Flat Paperboard Blank With End Tabs, Scored Central, Side, and End Panels That Form Trough—W. W. Metcalf, to Stevens & Thompson Paper Co., Greenwich, N. Y. No. 2,724,541. Nov. 22, 1955.

Bag Seal Comprising Channel-Like Metal Clamp-Strip, Notch, Elastic Membrane Lining—C. A. Bauer, Woodbridge, Conn. No. 2,724,543. Nov. 22, 1955.

Butter Print Protected From Fungus With Cellulosic Overwrap Having Exterior Wax Coat Containing Fat-Soluble, Organic Carboxylic Acid—D. Melnick, Teaneck, N. J., to Best Foods, Inc., New York City. No. 2,724,650. Nov. 22, 1955.

Bag-Filler With Hopper, Bag Support, Suction Means—F. F. Lindstaedt, San Anselmo, and F. S. Wright, Sonoma, Calif. No. 2,725,168. Nov. 29, 1955.

Ice-Cream Sandwich Carton Having Swingable Flaps Adapted to Receive Partially Frozen Confection Between Wafers—J. A. Duke, Atlanta, to Rite Pack Co., East Point, Ga. No. 2,725,178. Nov. 29, 1955.

Safety Bottle Closure Consisting of Crown Cap With Crimped Side Wall, Central Pressure Escape Opening, Sealing Disk, Frangible Membrane—G. Dalianis, Wappinger Falls, N. Y. No. 2,726,002. Dec. 6.

Food Container Employing Hinged Half-Round Bodies, End Walls With Continuous Grooved Flanges—P. H. McLeod, New Albany, Ind. No. 2,726,004. Dec. 6, 1955.

Cap Tightener Comprising Rotatable Chuck, Clutch, Drive and Control Means—R. W. Saumsiegle, Lexington, Mass. No. 2,726,028. Dec. 6.

Weighed-Quantity Bagger Having Successive-Receptacle Feed, Guide Means, Sequence Control—W. J. Sackett, Baltimore. No. 2,727,669. Dec. 20, 1955.

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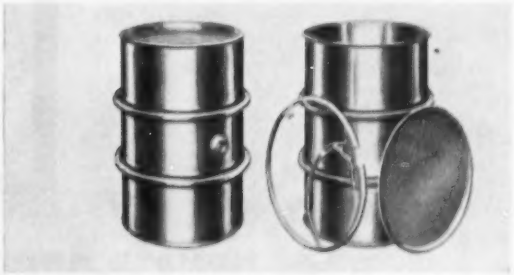

ENDURO STAINLESS STEEL DRUMS AND BARRELS provide maximum protection against contamination for your food products during shipping or storing. ENDURO Drums and Barrels resist corrosion. Resist hard use and abuse. They never need painting. Available in sizes up to 55-gallon capacity.

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Men & Companies

Thomas Paradine, (left), has been appointed assistant to the president of Coca-Cola Co., New York City, and **Lee Price,** (right), named director of personnel relations for the firm. Both are newly created executive posts.

Industry

Bluhill Foods, Inc., Denver, Colo., has been purchased by Edgar Schoen.

Borden Co. will begin a $3½ million program at Cubatao, Brazil, with new plants to produce methanol, formaldehyde and synthetic resins.

Cook Chocolate Co., Chicago, will soon build a $100,000 plant addition.

O. M. & R. Dietetic Labs., Inc., Columbus, Ohio, will begin work soon on a $200,000 plant. **Freedman Bros. Packing Co.,** Houston, Tex. plans to construct a $400,000 meat-packing plant.

Fresh Maid Orange Juice Co., Denver, has moved into its new plant in Englewood, Colo.

Golden Grain Macaroni Co., San Leandro, Calif., is replacing free, $10,000 worth of its products lost by grocers during recent California floods.

W. T. Hawkins, Ltd., food specialties firm, now has facilities in Belleville, Ontario to replace the plant destroyed by fire in Jan.

Home Canning Co., Blissfield, Mich., has been purchased by Dean Sellers of Detroit.

Jewel Tea Co., Inc., will begin manufacture of instant coffee at its Barrington, Ill. plant.

Kingan & Co., Inc., controlled by **Hygrade Food Products Corp.,** is planning $4 to $5 million expansion at its Indianapolis plant.

V. La Rosa & Sons, Inc. has announced a $10 million expansion program and has purchased additional land in Hatsboro, Pa. and Brooklyn, N. Y.

Libby, McNeill & Libby has leased 3,726 acres of citrus groves in Lake County, Fla. to supply part of oranges processed at its Ocala, Fla. plant.

Nat'l. Almond Products Co. has expanded its new Pittsburgh operation.

Nat'l. Starch Products, Inc. has purchased additional acres adjoining its Chicago plant.

Paulger's Blantyre Dairy Ltd. will build a $250,000 processing and distributing plant in Scarboro, Ont.

Pepsi-Cola Bottling Co. of Los Angeles has begun construction of a $750,000 bottling plant in Baldwin Park, Calif.

Procter & Gamble Co. of Canada Ltd. will begin work soon on a multi-million dollar plant in Montreal area to process shortening and edible oils.

Rosarita Products Co., Inc., Phoenix, has begun work on a new factory at Mesa, Ariz., to contain 15,000 sq. ft. of processing space.

Standardized Products Co. has been formed in Santa Ana, Calif. by Lloyd Bellisime, former executive v.-p. of **Gentry Div. of Consolidated Foods**

PICK *Clinton*®

CORN STARCH . . .
. . . CORN SYRUP
. . . REFINED CORN OIL
. . . DEXTROSE

Among food processors using Clinton products, you'll find them all — canner, packer and baker . . . brewer, candy and ice cream maker.

All these food processors have one thing in common: They know that *quality* processing requires *quality* ingredients. For many years, Clinton has had a reputation for producing the very best in dextrose (Clintose), corn starches, corn syrups and refined corn oil for the food industry.

That's why our customer files hold some of the best-known food names in America. If *your* name's not there, it ought to be! Can we get together soon?

and remember . technical service in connection with your specific problems is available upon request.

Quality products
FROM THE WORLD'S CORN CENTER
CLINTON
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Corn Processing Division
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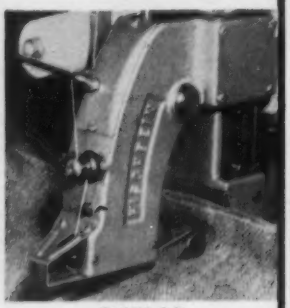
Versatile, Low Cost

FISCHBEIN *Portable* BAG CLOSER



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Handles All Varieties of Bags!

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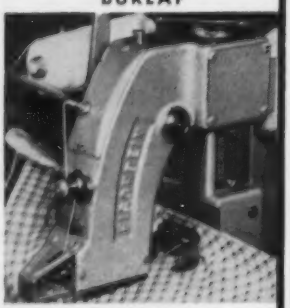
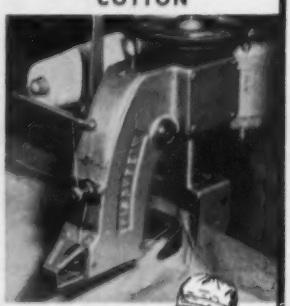
Total Weight only 10½ lbs.



COTTON

HEAVY JUTE & SISAL



PAPER

- No installation necessary . . . . plug into any outlet.
- Closes average 100 lb. bag in less than 6 seconds.
- Simple to operate and maintain.
- Can be suspended for stationary use.
- Lowest priced bag closer on market.

Fully Guaranteed!

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2720 30th Ave. S., Minneapolis 6, Minn.

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Firm Name_____

Address_____

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Henry A. Kellerhals has been elected vice-president of Virginia Dare Extract Co., Brooklyn, N. Y. He formerly was head of firm's Beverage & Korker Franchise Div.

Corp. for sale and distribution of dehydrated onion and garlic products and other vegetables.

Wm. J. Stange Co., Chicago, has purchased **American Spice Mills,** also of Chicago.

S & W Fine Foods Inc., San Francisco, has moved its Berkeley, Calif. distribution warehouse facilities to new $2.5 million international headquarters on San Francisco-San Mateo county line.

Topps Chewing Gum, Inc., Brooklyn, N. Y. will acquire gum manufacturing equipment of **Bowman Gum Div. of Connelly Containers** on April 1.

Van Kirk Chocolate Corp., Toronto, has purchased the 60,000 sq. ft. plant and equipment of **Blue Ribbon Corp.,** food and spice firm.

Welch Grape Juice Co. has established its own advertising agency in New York City to be known as **Richard K. Manoff, Inc.**

Whitman Labs, Inc. has been formed to make and sell chemicals and food products.

Wicks Corp.'s Mich. Bean Div. will enlarge its processing plant at Saginaw, Mich.

Personnel

Thomas Bonica has been named manager of fruit extract research and quality control for Polak & Schwarz, Inc., Teterboro, N. J.

Walter Driskill has been elected vice-president in charge of marketing for Gunther Brewing Co., Baltimore, Md.

Clarence Eldridge has been appointed marketing consultant for Campbell Soup Co., Camden, N. J.

William Filz is new director of research for National Cranberry Assn., Hood River, Ore.

George Froehringer has been named supervisor of the monosodium glutamate plant of A. E. Staley Mfg. Co., Decatur, Ill.

Raymond Greinke has been appointed manager of Pepsi-Cola operations in the Philadelphia area.

Harold Janovsky is now director of flavor div. at Dodge & Olcott, Inc., New York City.

Raymond Kenitzer has been appointed superintendent of bottling at Blatz Brewing Co., Milwaukee.

Dr. Allen Kingsley has been appointed senior research chemist for Spencer Kellogg & Sons, Inc., Cheektowaga, N. Y.

F. Gilbert Lamb, president of Lamb-Weston, Inc., has been elected president of **Nat'l** Assoc. of Frozen Food Packers.

T. E. Lang has been named vice-president of Carnation Co., Toronto, and **J. N. Hardy,** general superintendent, is now a director.

Arthur Loomis is now marketing manager, refrigerated foods div., for Pillsbury Mills, Inc., Minneapolis.

Lyle Mertz has been appointed plant superintendent of General Mills' flour mill in Buffalo, N. Y.

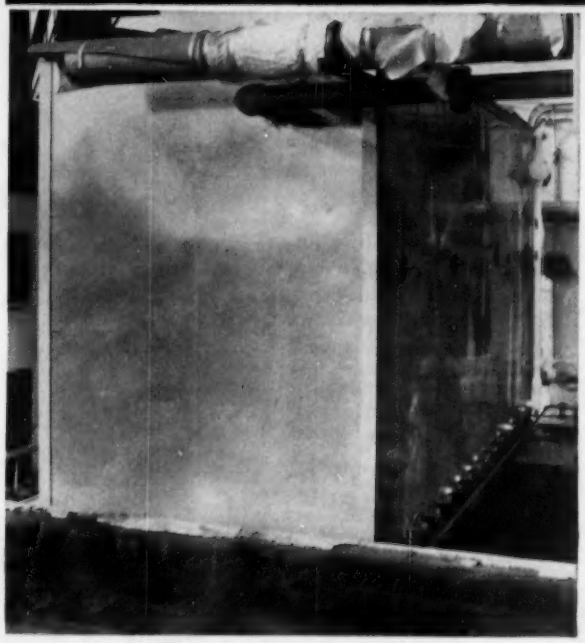
Charles Mortimer, president of general Foods Corp., has received an honorary degree in mechanical engineering from Stevens Institute of Technology.

Jo Parks has established a service as technologist for food processors in Atlanta, Ga.

Leroy Peterson has been named director of Corn Products Refining Co., New York City.

Ernest L. Pope is now in charge of all plant operations for Jan-U-Wine line of Chinese foods.

The "KING ZEERO" Recirculated Ice Water System



Last one of 4 "King Zeero" units installed on ramp at Ira Wilson & Son dairy, Detroit, Mich.

GIVES YOU SPEEDY PRODUCT COOLING --

32°-34° COLD ICE WATER

REQUIRES NO MECHANICAL AGITATOR

Permanent louvres act as non-mechanical agitators - no moving parts to service or upkeep costs

The simplicity of "King Zeero's" operation makes for efficient and trouble-free operation. Tons of ice are built-up daily on the coils during the off-peak hours. This chills circulating water to provide an ample supply of 32°-34° ice water, or lower temperature brine, for all plant needs.

Operation is entirely automatic, The "King Zeero" is economical to operate—profitable to own.

THE KING ZEERO COMPANY
4300-14 W. MONTROSE AVE., CHICAGO 41, ILL.

Strahman AUTOMATIC WATER-SAVER **SPRAY NOZZLE**

Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water.

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

CONSULT YOUR DEALER

STRAHMAN VALVES, INC., 18 HUDSON STREET, NEW YORK 13, N. Y. U. S. A.

Measure soluble sugar content or dissolved solids *instantly* with

THE NATIONAL HAND REFRACTOMETER

Test juices, beverages, syrups, jellies, tomato products, etc. Check maturity of crops right in the field.

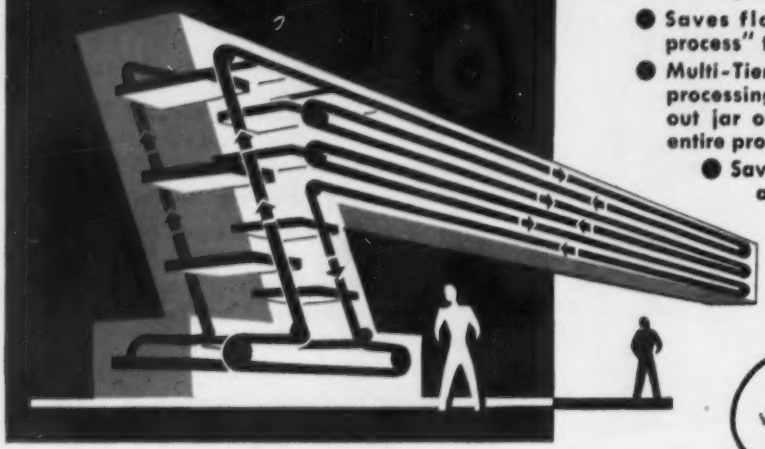
EASY TO USE Place two or three drops of liquid on test plate, close cover and read percent sugar or dissolved solids instantly. No calculations—no waiting. Three models cover the range of 0 to 90%. Accuracy to 0.2%.

New Low Price
$49.50
complete with case

Ask for Bulletin FE356

NATIONAL INSTRUMENT CO.
2701 Rockwood Ave. • Baltimore 15, Md.

ARE YOUR PRODUCTS HEATED, COOLED, OR FROZEN?

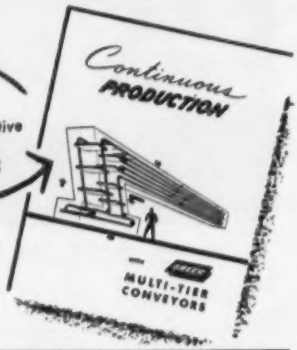


Make new PROFITS from unused overhead space while processing your products under exact time, temperature, and atmospheric control . . . with a Greer MULTI-TIER.

Converts heating, cooling, drying, and freezing operations from batch to continuous processing. In one application alone, MULTI-TIERS have boosted production 7 times per man, in ¼th the floor space.

- **Saves floor space—ideal wherever long "in process" travel required.**
- **Multi-Tier trays convey products through *controlled* processing cycles of 10 minutes to 24 hours without jar or jolt. Products remain on trays during entire process.**
- **Saves labor. Automatic or manual loading and unloading.**

FREE
Write for informative 8-page Bulletin 55-12



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NoDrip® ...STOPS CONDENSATION DRIP

NoDRIP PREVENTS RUST — ANYONE CAN APPLY

NoDrip plastic coating is easily applied to tanks, containers, suction lines, vats, pipes, walls, ceilings, etc. NoDrip adheres to metal, concrete, brick, plaster. It forms a seamless 100% moisture-proof covering that is effective as soon as dry. Acid, alkali and brine resistant.

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Interesting 32-page Handbook shows what NoDrip is and what it does.
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J. W. MORTELL CO. • 598-C BURCH ST. • KANKAKEE, ILL.
TECHNICAL COATINGS SINCE 1895

PREST-O-MATIC® ELECTRIC COLD STORAGE DOORS SAVE TIME and REFRIGERATION

Prest-O-Matic Doors save refrigeration by reducing "open-door-time", up to 75%. Doors are kept closed when not in use. Heat stays out, cold stays in.

Fork lift truck traffic moves through Prest-O-Matic doors quickly and automatically. No need for driver to dismount to open door.

Electrically operated Prest-O-Matics are supplied as complete units, easily installed. They seal tight when closed and slide out of the way when open. Available in single or double sliding models for coolers or freezers.

Send for complete information.

FINE DOORS SINCE 1878

CLARK DOOR CO.

505 Hunterdon St., Newark 8, N. J.

Dr. A. I. Goldberg, (left), and **O. B. Wurzburg, Jr.,** (right), have been named associate directors of research at National Starch Products, New York City.

George Ryan, secretary of George A. Hormel & Co., has been elected treasurer.

Byron C. Schram has been named treasurer of Farm Crest Bakeries, Inc., Detroit.

Hugo Slotkin, president of Hygrade Food Products Corp., Detroit, has been elected chairman of the board.

George Vail has been made v.-p. and asst. to the president of Morton Frozen Foods, Inc., Louisville, Ky.

Lowry Wyatt, general manager of manufacturing for Gerber Products Co., has been elected president of Calif. Processors & Growers Inc., and **George Coley,** made v.-p.

Associated Industries

Aluminum Co. of America will expand its aluminum foil facilities with three new mills at its Tenn. works.

American Can Co. has broken ground for a new plant at Salem, Ore.

American Viscose Corp. will expand its annual cellophane capacity by 50 million lbs.

Atlanta Paper Co. has announced its sales reached an all time high in 1955, increasing 21% over '54.

Cherry-Burrell Corp. has elected three new vice-presidents—Norman Nelson, H. N. Barnes, and Howard Cherry, Jr.

Crown Zellerbach Corp. has agreed to purchase the assets of **Waxide Paper Co.,** with plants in Kansas City and St. Louis.

Robert Levy & Assoc., packaging consultant service, has been formed in Chicago by Mr. Levy, formerly with **Container Corp. of America.**

Merck & Co., Inc., Rahway, N. J., has presented an educational exhibit on vitamins to the Smithsonian Institute in Washington, D. C.

Morningstar, Nicol, Inc., has promoted J. B. Morningstar, grandson of the founder, to v.-p.

Marathon Corp., Menasha, Wis., has elected John Stevens, Jr., president, board chairman.

Union Bag & Paper Corp., New York City, has appointed Wilton Cole and John Harrison vice-presidents.

Visking Corp. will construct a $5.4 million plant to manufacture sausage casings in Loudon, Tenn.

Deaths

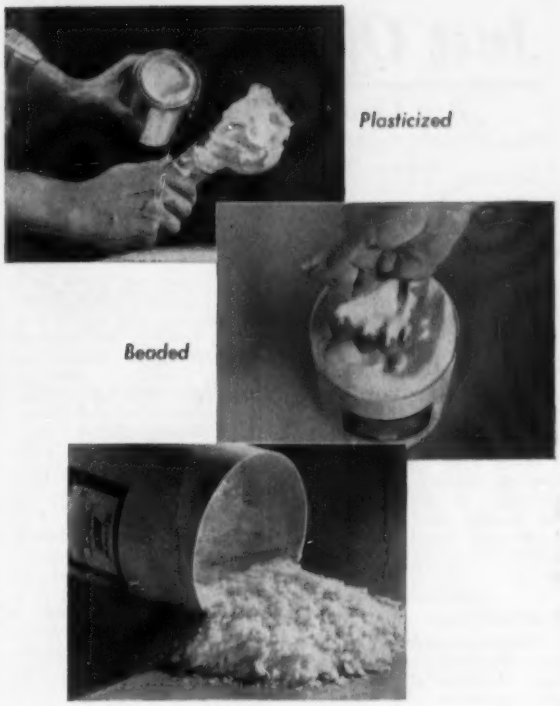
J. R. T. Bishop, 59, vice-president in charge of Ac'cent International Div., International Minerals & Chemical Corp.—Jan. 23.

William Haebler, 55, v.-p., treasurer, and director of van Ameringen-Haebler, Inc., N. Y. —Feb. 6.

Maurice Morrison, 45, advertising manager of Campbell Soup Co., Ltd.—Feb. 2.

Jamer Scrutton, 68, former v.-p. and general manager of H. J. Heinz Co. of Canada Ltd. —Jan. 17.

Paul Trigg, 73, president, Montana Flour Mills Co.—Feb. 8.



How'll you have your **monos?**

We make Myverol® Distilled Monoglycerides in three physical forms: tiny beads, flakes, and a chill-plasticized fat. One of them is bound to incorporate easily in your product.

We make them from most common food fats and oils. Examples: cottonseed oil, soybean oil, lard, tallow.

But money is what makes the world go round. Less of it is required to get a given amount of emulsifying effect with Myverol Distilled Monoglycerides than with undistilled mono-di mixtures. Our unique molecular distillation process also removes taste-degrading impurities. This is a free bonus, paid off in quality of the end food products.

The best way to find out which is the best physical form of Myverol Distilled Monoglycerides for your product and which oil makes the best monoglyceride for your purpose is to send for samples and try them out under your processing conditions. Write *Distillation Products Industries,* Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • W. M. Gillies and Company, Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides made from natural fats and oils

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Also...vitamin A in bulk for foods and pharmaceuticals

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Just Off the Press

New Catalogs and Bulletins from manufacturers of equipment and supplies —Free For The Asking—

PLANT ENGINEERING

Water Treatment

Technical report considers chemical and physical tests for selection of proper methods for treating water supplies. Various coagulants are discussed. Technical reprint T-138, 10 p.—*Graver Water Conditioning Co., New York. (212A)*

Stainless Pump

Leaflet gives facts on compact corrosion-resistant pump, constructed of stainless steel alloy. It has capacity to 40 gpm., with heads up to 55 ft. 1p.—*Eco Engineering Co., Newark, N. J. (212B)*

Plastic Blowers

Comprehensive folder lists wide applications and specifications for a series of centrifugal blowers made of un-plasticized polyvinyl chloride plastic. Units are specifically designed to handle chemical fumes and polluted air at temperatures of 40-140 F. 12p.—*Industrial Plastic Fabricators, Inc., Norwood, Mass. (212C)*

Clutches and Couples

Specifications are tabled for a line of standard clutches and clutch-coupling units used in overrunning, indexing, and backstopping applications. Cross-section drawings, dimensions, and engineering data present basic information on installation and maintenance. Catalog 103-C, 8p.—*Formsprag Co., Van Dyke, Mich. (212D)*

Spherical Union

Considers details of a spherical, union connector that compensates up to 10 deg. for mis-aligned gage valves. Union also adapts to a tapped hole drilled at an angle to the mounting plane. 2p.—*Jerguson Gage & Valve Co., Somerville, Mass. (212E)*

High-Pressure Meters

Gives specifications, engineering data, and pressure drop charts for three types of high-pressure meters. Units are available in steel, bronze, and aluminum, with capacities up to 30,000 gpm. Bulletin 571, 8p.—*Granberg Corp., Oakland, Calif. (212F)*

Automatic Boiler Feed

Considers compact unit—consisting of an electric motor, pump assembly, galvanized receiving tank, and controls—for automatic, condensate and feed water boiler supply. Selection data is included. Bulletin 4H, 4p.—*Mears-Kane-Ofeldt, Inc., Bridgeport, Pa. (212G)*

Freezer Door Selection

Treats of problems concerning proper selection of cold storage doors. Pictures and diagrams illustrate particular situations and their solution. Insulation, fire retardance, and power operation are discussed. 20p.—*Jamison Cold Storage Door Co., Hagerstown, Md. (212H)*

Non-Electric Magnets

Illustrates 4 basic types of non-electric magnets and lists engineering data and specifications for 35 standard sizes, from 4-72 in. wide, available in each type. Diagrams show numerous applications. Catalog 1205-D. 8p.—*Dings Magnetic Separator Co., Milwaukee. (212I)*

Straight-Flow Valve

Shows advantages and features of a diaphragm valve that opens fully and eliminates obstructions to fluid flow. Chart presents selection figures. 4p.—*Grinnell Co., Inc., Providence. (212J)*

Solenoid Pilots

Depicts various types of solenoid pilots used on regulating valves for steam, air, gas and liquid service. Schematic diagrams show typical applications, and bulletin lists construction materials and advantages. 4p.—*Spence Engineering Co., Inc., Walden, N. Y. (212K)*

Hose, Duct Price List

Lists prices for a line of rubber-coated flexible hoses and ducts. Additional pictures show connectors and unit construction. Bulletin 60, 6p.—*Flexaust Co., New York City. (212L)*

Packaged Dust Collectors

Concerns action and efficiency of dry-filter and precipitation-type packaged dust collectors. Sizes range from 1,000 to 10,000 cfm. of free air. Bulletin 172-CFF, 4p.—*Green Fuel Economizer Co., Inc., Beacon, N. Y. (212M)*

Fire Protection

Detailed manual considers methods of fire detection, prevention, control, and extinguishment. Water, foam, carbon dioxide, and dry chemical systems are all covered. Catalog 73, 28p.—*Automatic Sprinkler Corp. of America, Youngstown, Ohio. (212N)*

Hot-Air Diffusers

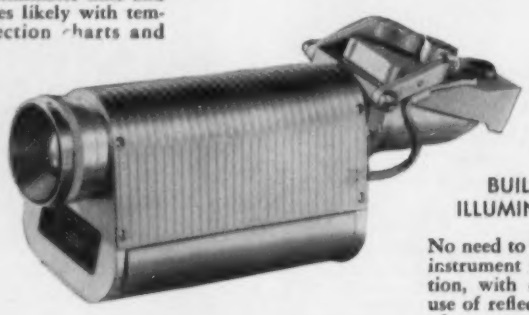
Concerns installation and operation of a ceiling-mounted hot air diffuser for plant heating systems.

HOW NEW AO HAND REFRACTOMETER CUTS COSTS

BUILT-IN TEMPERATURE COMPENSATION

Automatically eliminates time and error possibilities likely with temperature correction charts and thermometers.

Refractometric determinations are important in your pick or pack problems. The new AO Hand Refractometer will save you time, effort and money . . . here's how.



EASY-TO-READ SCALE

Unusually clear eyepiece image assures reading accuracy to 1/10 of one percent. Dividing line appears in sharp contrast even with dark colored liquids. Scale graduated in increments of 2/10 of one percent, has range of 0-30% sucrose (or degrees Brix).

BUILT-IN ILLUMINATION

No need to rely only on external light. Use instrument 3 ways; with built-in illumination, with external light source, and by use of reflection technique for analyzation of opaque solids.

ANYONE CAN USE IT

New AO Hand Refractometer is fast . . . low cost . . . requires no special training, no computations . . . direct reading scale gives immediate, accurate, on-the-spot determinations.

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Please send full information on the new AO HAND REFRACTOMETER.

Name .....

Address .....

City ..... Zone ..... State .....

Readily adjustable to provide air patterns ranging from horizontal to vertical, it will project for distances up to 50 ft. Catalog F7722, 4p.—*Barber-Colman Co., Rockford, Ill. (212O)*

Bottle Oilers

Specifies series of glass-body and aluminum-body bottle oilers that maintain constant oil level in bearing reservoirs. All models are pictured. Circular 580, 4p.—*Lunkenheimer Co., Cincinnati, Ohio. (213A)*

Automatic Door Openers

Leaflets show installation and operation of a series of automatic, electrical door-openers for sliding, overhead, rolling, and swinging doors and gates. 4p.—*Robot Appliances, Inc., Dearborn, Mich. (213B)*

Snap-Type Coupling

Depicts wide line of snap-type, quick-connective couplings for various gas and liquid lines. Tables list available sizes. Catalog 100, 42p.—*Hansen Mfg. Co., Cleveland. (213C)*

Feeder Busway

Considers component parts of a feeder busway system, running from distribution transformer to switchboard. Elbows, offsets, and other special fittings are pictured. Low-impedance system carries up to 4,000 amps. and is available in 2, 3, and 4 poles, 3 phase, 4 wire. Catalog GEA-6151, 16p.—*General Electric Co., Plainville, Conn. (213D)*

Synthetic Lubricants

Comprehensive booklet covers properties and applications of a series of polyakylene-glycol derivatives. Compounds have a multitude of uses from mechanical lubricants, hydraulic fluids, and rubber textile lubricants, to heat-transfer fluids, anti-foam agents, and solvents. Form 6500D, 52p.—*Carbide and Carbon Chemicals Co., New York City. (213E)*

Custom Fabrication

Considers services available from a custom fabricator of processing equipment. Photos show jobs tailored for the food industry. 12p. —*Puget Sound Fabricators, Inc., Seattle. (213F)*

Speed Reducers

Presents new line of helical-gear drives for speed reduction. Tables list applications, ratings, and dimensions. Cut-away views show double- and triple-reduction construction. Book 2651, 16p.—*Link-Belt Co., Chicago. (213G)*

Protective Coating

Gives facts on use of a synthetic rubber coating for protection of surfaces exposed to corrosive atmospheres. Substance is said to be easily applied and resistant to oil, grease, acids, and alkalies. Bulletin 701, 4p.—*Carboline Co., St. Louis. (213H)*

Automatic Lubricators

Pictures operation and blueprints specifications for a series of automatic bearing-lubricators that deliver metered quantities of oil in adjustable time cycles. Tables list models available in five basic drive speeds, for left- or right-hand drives, and for adjustable flow rates. Bulletin 3A.—*Bijur Lubricating Corp., Rochelle Park, N. J. (213I)*

Smokeless Incinerators

Pictures and table illustrate features of a series of steel incinerators rated from 4- to 30-bushels capacity. Units can be fired with a variety of fuels and burn wet, dry or mixed refuse. Construction is said to eliminate smoke and odors. 4p.—*Winnen Incinerator Co., Bedford, Ohio. (213J)*

Balanced Pump

Specifies a series of double-ended, motor-centrifugal pumps. Unit uses 2 impellers and pump chambers at either end of motor section for high head service and nearly perfect hydraulic balance. Performance and operating principles are detailed. Bulletin 1020, 4p.—*Chempump Corp., Philadelphia. (213K)*

Electrical Supplies

Catalog covers a wide line of safety switches, circuit breakers, motor controls, and other accessories for electrical systems. Pictures show each unit and tables list available models. Prices are included. 1956 catalog, 65p.—*Cutler-Hammer Inc., Milwaukee. (213L)*

Unique Pump

Diagrams working operation and tables selection data for a series of positive-action Moyno product pumps. Units handle wide range of materials from liquids to non-pourable pastes and slurries. Bulletin 40, 4p.—*Robbins and Myers, Inc., Springfield, Ohio. (213M)*

Dust and Fume Control

Shows dust elimination action of a fabric-tube-type dust collector. Advantages are listed, available sizes are tabled. Catalog 372-C, 8p.—*Wheelabrator Corp., Mishawaka, Ind. (213N)*

Chemical Pumps

Designed for handling corrosive liquids, compact centrifugal-type pump is shown in cross-section drawings. Construction materials are listed and component parts pictured. Graphs show performance curves. Bulletin 725-4, 8p.—*Goulds Pumps, Inc., Seneca Falls, N. Y. (213O)*

Booster Compressor

Leaflet presents principal features of a rotary, booster compressor, comprising a water-jacketed

AHHHHHHHHhhhh...
it must be
Florasynth's
WORCESTERSHIRE
SAUCE BASE
AND
BARBECUE
SAUCE BASE
... you're cookin'... Nothing else matches it... Only Florasynth's bases can stir your appetite so easily ... and yet so economically ... impart to your sauce an aroma and taste utterly irresistible ...
TRY A SAMPLE...
Florasynth
LABORATORIES, INC.

Immediate Savings . . .
WITH
Hope
TYPE
19A
The 4 line model accurately fills 50 to 100 containers per minute . . . 6, 8 and 10 line models also available capable of accurately filling up to 250 containers per minute. Hope Type 19A Filling Machines are now in profitable use from coast-to-coast filling liquids, semi-liquids or viscous products in jars, plastic bottles or tin cans. For high speed, accurate filling machines look to the leader —
Write for catalog of our complete line
HOPE MACHINE COMPANY
9400-40 STATE ROAD • PHILA. 14, PA.

cylinder and sliding vane rotor. Horsepower ratings from 15 to 600 with direct drive, and 10 to 125 hp. with V-belt drive. Bulletin I-134, 2p.—*York Corp., York, Pa. (213P)*

Stainless Piping Systems

Presents cost-saving advantages of a line of stainless steel pipes and fittings. Light-wall tubing and fast-assembly fittings reduce installation time and give tight, leak-proof joints. 4p.—*Horace T. Potts Co., Philadelphia. (214A)*

Leak-Proof Gate Valves

Drawing shows construction of a tight, wedge-type gage valve that employs plastic seals to prevent fluid leaks. Catalog Section A, 2p. —*Hammer Valves, Inc., Long Beach, Calif. (214B)*

Proportioning Pumps

Bulletin pictures line of reciprocating-type proportioning pumps and controls. Tells operating principles and tables selection data. Bulletin S-1254, 16p.—*Philadelphia Pump & Machinery Co., Inc., Philadelphia. (214C)*

Plastic Equipment

Data sheets present comprehensive information on stacks, ducts, hoods and tanks constructed of chemically-resistant reinforced plastics. Tables list available equipment sizes and prices. 24p.—*Pla-tank Inc., West Warren, Mass. (214D)*

Hopper Vibrators

Pocket folder shows line of air-powered or electric-driven bin, hopper, and railroad car vibrating devices for loosening and moving granular materials.—*Cleveland Vibrator Co., Cleveland. (214E)*

Small-Size Steam Traps

Leaflet illustrates construction of a tiny, thermodynamic steam trap with only one moving part. Capacity ranges from 10 to 600 psi. Bulletin 257-B, 2p.—*Sarco Co. Inc., New York City. (214F)*

Cartridge Filter Line

Bulletin covers advantages of a cartridge-type filter, and depicts units in air- and liquid-line applications. Photos show installation. Catalog 051, 12p.—*Cuno Engineering Corp., Meriden, Conn. (214G)*

Magnetic Traps

Specifies a series of pocket-type liquid-line magnetic traps. Trap element consists of a circular series of magnetic tubes. Diagrams show suggested installations. Bulletin B-605, 4p.—*Eriez Mfg. Co., Erie, Pa. (214H)*

Steam Purifier

Shows action of a compact, in-line centrifugal steam separator for cleaning and drying contaminated air, steam, or gases. Absence of moving parts is said to keep maintenance cost low. Various applications shown in diagrams. Bulletin 501, 8p.—*V. D. Anderson Co., Cleveland. (214I)*

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Presents data on a line of thermostatic, bellows-type steam traps. Units can be obtained in bronze, Monel, and stainless steel construction. Bulletin 1055, 8p.—*W. H. Nicholson & Co., Wilkes-Barre, Pa. (214J)*

Equipment Doors

Treats of many different doors for heat exchangers, autoclaves and sterilizers that feature quick-opening and high pressure capacity. Available with manual or pneumatic operation, and capacities from full vacuum to 330 psi. Bulletin 2030, 4p.—*Patterson-Kelley Co., Inc., E. Stroudsburg, Pa. (214K)*

Cooling Towers

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PROCESSING

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Considers descriptions of machines and general information on selection and application of a series of dairy centrifuges for separating and clarifying. Booklet 155, 24p.—*Centrico, Inc., Englewood, N. J. (214M)*

Evaporation Equipment

Discusses features of three types of evaporators for applications to a very wide range of volatile solutions and powders. Pictures show construction and table lists specifications. Bulletin 125, 4p.—*Rodney Hunt Machine Co., Orange, Mass. (214N)*

Spray Dryer Line

Comprises features and specifications for four types of conical spray dryers: A laboratory model, pilot plant size, and two high tonnage units. Photos show typical installations. Bulletin 35, 8p.—*Bowen Engineering Corp., North Branch, N. J. (214O)*

Suction Leaf-Filters

Gives construction and operational advantages of a leaf-type filter employing pump suction to facilitate liquid-solid separation. Economical units are used where low pressures can be maintained in the filtering cycle. 6p.—*Hercules Filter Corp., Hawthorne, N. J. (214P)*

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Silicone Parchment

Considers use of a silicone-treated parchment paper for freezing sweet dough. Layered product can be stacked 5 to 6 high on freezer trays, because treated paper prevents sticking. Sample parchment included. 4p.—*Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich. (215A)*

Flash Heater

Colorful bulletin illustrates flash pasteurization setup for fruit and vegetable juices using a plate-type heat exchanger. Stainless steel construction speeds sanitation. Bulletin P-147, 6p.—*Walker-Wallace, Inc. Buffalo. (215B)*

Inert-Gas Generators

Pictures protective-atmosphere, gas generators for application in storage, dehydration, drying, shipping, and packaging of food products. Diagram illustrates machines' functions. 4p.—*Barmotive Products, Inc., San Leandro, Calif. (215C)*

Radiation Sterilization

Highly interesting manual considers characteristics of the several forms of radiation practical for food processing, and details application of high voltage electron beams. Extensive diagrams show installation and charts consider economics of the process. Bulletin E, 34p.—*High Voltage Engineering Corp., Cambridge, Mass. (215D)*

Automatic Scalers

Discusses construction, operation, feeding arrangements, and capacities of a three-model line of automatic weighing units. Photographs and diagrams illustrate installations and scale components. Bulletin 8946A, 6p.—*Richardson Scale Co., Clifton, N. J. (215E)*

Fast Cleaning Filter

Covers operation and advantages of a cylindrical filter, utilizing a series of perforated metal tubes encased in a synthetic fiber fabric. To clean, air pressure trapped in dome is suddenly released through the tubes. Hammer-like blow expands fabric and dislodges filter cake. Bulletin 114-1155, 4p.—*Industrial Filter & Pump Mfg. Co., Chicago. (215F)*

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Dehydrating Equipment

Concerns wide line of dehydrators ranging from rotary-drum dryers to continuous presses for extruding excess moisture. Rotary dryers available in steam-heated, hot-air, or direct-fired units. Bulletin 2010, 10p.—*Davenport Machine & Foundry Co., Davenport, Ia. (215H)*

Sheet-Metal Filter Plates

Specifies advantages of a corrugated, sheet-metal filter plate for use in plate-and-frame filter presses. Construction is said to offer increased strength and filtering speed. Bulletin 541, 4p.—*Multi-Metal Wire Cloth Co., Inc., New York City. (215I)*

Unique Mixer

Refers to a specially-designed mixer, available in both laboratory and production models, that employs a unique mixing head. Diagrams and photos show action and component parts. 4p.—*Hermas Machine Co., Hawthorne, N. J. (215J)*

Uniform Pulverizer

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Continuous Weigher

Discusses continuous scaling and recording of free-flowing solid materials with a Massometer. Unit acts by directing flow of material on a rotating impeller, driven by a synchronous speed electric motor. Motor housing torque is proportional to rate of flow of the mass. Publication TP-1-M-2, 4p.—*Wallace and Tiernan, Inc., Belleville, N. J. (215L)*

Impact Grinder

Considers feature points of a hammermill that incorporates a remote control device enabling quick screen changes. Diagram shows dimensions. Bulletin 110, 4p.—*Sprout-Waldron & Co., Muncy, Pa. (215M)*

INSTRUMENTS

Time Delay Relays

Shows wiring and application diagrams, and operating sequences for a series of solenoid-actuated, pneumatically-timed, time-delay relays that can be set from 1/10 sec. to 5 or more minutes. Bulletin SR3, 4p.—*Elastic Stop Nut Corp. of America, Elizabeth, N. J. (215N)*

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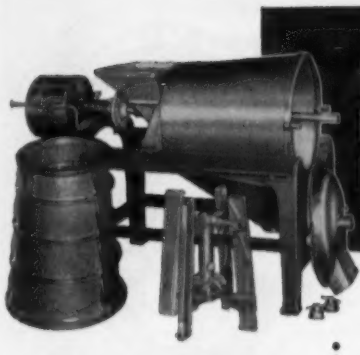

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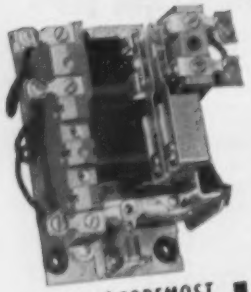

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Miniature Instruments

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Remote-Reading Gages

Details facts on a series of remote-reading liquid-level gages, containing a new convex scale that permits 180-deg. visibility without distortion. Bulletin 246, 8p.—*Jerguson Gage & Valve Co., Somerville, Mass. (216C)*

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Laboratory Sifters

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Company magazine concerns latest electronic equipment for

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Illustrates construction and operating features of an auger-type, semi-automatic bagging machine. Unit incorporates a bag-shaking and sealing device. 6p.—*E. D. Coddington Mfg. Co., Milwaukee. (217D)*

Plastic Vacuum Pack

Colorful bulletin illustrates machine for vacuum packaging meats, pickles, nuts, bakery products and other foods in plastic bags. Specifications and capacities are detailed. Model 6-9, 6p. —*Standard Packaging Corp., Clifton, N. J. (217E)*

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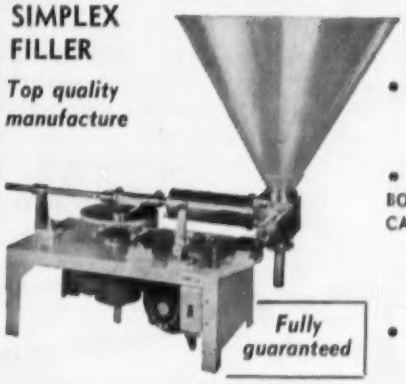

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RIttenhouse 6-0670
E. MINGLE
H. BOZARTH

PITTSBURGH, 22
919 Oliver Bldg.
ATlantic 1-4707
C. J. LOUGHLIN

ST. LOUIS, 8
3615 Olive St.
JEfferson 5-4867
W. HIGGENS

SAN FRANCISCO, 4
68 Post St.
DOuglas 2-4600
E. WYCOFF

SEARCHLIGHT SECTION

(Classified Advertising)

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED ——RATES—— *DISPLAYED*

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line. BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADVERTISEMENTS to N. Y. Office, 330 W. 42nd St., N. Y. 36, N. Y. for April issue closing March 22nd

····IN STOCK AT LOEB'S····

Cappers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 17" stain. steel, 20" lithcoated, Tolhurst 26" copper.
Clarifiers: De Laval model 84-51. Sharples Vaporite, st. steel.
Conveyor, port. Rapid Standard, 16' lg.
Conveyer Tables: belts from 5½" wide x 12' long and up.
Cutter, Bone: Wausau, 5 hp.
Cutters, silent, Buffalo 32" and 43".
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Stokes 20 shelf, Devine 10 shelf. Devine 20 shelf.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure—Alsop, Sparkler, Lamax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½x1', Denver 1x3'.
Fryolators: Pitman gas fired 18" well.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 Gph. Gaulin.
Kettles: Stainless steel 5 to 300 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto and semi-auto.
Colloid: Premier 3 hp. and 5 hp.
Hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffray 30 x 24", Williams #2 and 5X.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Pasteurizer: Wallace-Walker plate type, 200 GPH., st. steel.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Retorts: 42 x 72" and 24 x 30".
Screens: Rotex 20 x 48", 42 x 84".
Roball 40 x 120" stainless steel.
Selectro 4 x 10', Abbe Bivtergess #1.
Sealers, carton: Standard-Knapp, Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Tablet Presses: single punch and rotary.
Tanks: Glass lined, various sizes.
Stain. steel 25 gal. to 1200 gal.
Viscolizer: 150 gal. Cherry-Burrell.

Send us your inquiries and list of idle equipment.

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. — **Chicago 22, Ill.**
Telephone: Seeley 8-1431 — **Our 31st Year**

RIGHT PRICE—FAST DELIVERY—GUARANTEED

LOOK

3—Shriver 42"x42" cast iron, plate & frame closed del. Filter Presses, 27-1" chambers.
3—Day 15 gal. Pony Mixers, m.d. S.S. cans.
2—Haskins Cap Tighteners, m.d.
1—4TH Mikro Pulverizer 60 HP, tefc.
2—Stainless Steel Hersey Rotary Dryers, 5'x28' and 6'x23'.
2—8'x125' Rotary Kilns.
3—Buflovac 42x120, 33x120 Atmos dbl. Drum Dryers, complete; 1—American 24x36.
2—54"x70" and 1—40"x60" Bird Continuous Centrifugals, S/S Solid bowls.

No Better Machines at any Price

3—Unused #12 Sweetland FILTERS, 48 bronze monel covered bottom drainage leaves 3" o/c. latest type; 1—#2, 23 copper leaves 1½" ea.
1—Day #30 Imperial jack. Mixer, 75 gal.
1—Buflovac 48"x40" Drum Flaker, chrome plated, s/s ends.
9—Sperry 18"x18" Filter Presses, 11 ch.
1—Link-Belt Co. ROTARY DRYER, Roto-Louvre, #502-16 Type C, 5'3" dia. 16' long with #304 8/8 contact parts.
5—Horiz. Dry Powder Ribbon Mixers, 4000#, 1500#, 500#.

Our 38th Year

Wanted Your Idle Machines or Plants

CONSOLIDATED PRODUCTS COMPANY, INC.
Tel.: HO 3-4435 • 159 Observer Highway HOBOKEN, NEW JERSEY N. Y. Tel.: BA 7-0600

SPRAY DRYING UNIT

We offer for immediate sale

One—Drying and Concentrating Company's spray drying unit complete with stainless steel drying chamber, air heating unit and filter, pumps, thermometers, preheaters, etc.

Open to inspection at any time at our plant at Peoria, Illinois.

ALLIED MILLS, INC.
P. O. Box 539 — Peoria, Illinois

····· FOR SALE ·····

- 1—150 SQ. FT. STAINLESS HEAT EXCHANGER, SHELL AND TUBE, #4 FINISH
- 1—2,500 GAL. STAINLESS HORIZONTAL TANK, AGITATED, #4 FINISH
- 1—2,800 GAL. STAINLESS HORIZONTAL OVAL TANK, #4 FINISH
- 1—4,000 GAL. STAINLESS HORIZONTAL TANK, INSULATED, AGITATED, #4 FINISH
- 2—14,000 GAL. GLASS LINED TANKS, HORIZONTAL, ALL WELDED
- 1—6,000 GAL. ALUMINUM TANK, HORIZONTAL
- 4—VACUUM PANS, 36"-42"-60" STAINLESS, #4 FINISH
- 1—NIAGARA FILTER—MODEL 95-36, 92.7 SQ. FT.

BEST EQUIPMENT COMPANY
617 Davis Street — Evanston, Illinois
DAvis 8-0926

FOR SALE

Complete Pneumatic Scale Straightline High Speed Cartoning Unit

In Excellent Operating Condition

Available For Immediate Delivery

AT A FRACTION OF THE ORIGINAL COST

These units consist of the following machines:

- High Speed Carton Feeder
- High Speed Bottom Sealer
- Type D-1 Wax Liner
- Six-Scale Net Weight Weigher
- High Speed Top Sealer with Compression Drying Unit
- All interconnecting conveyoring

This complete unit was in operation until recently.

Operated at approximately 70 units per minute.

INSPECTION CAN BE ARRANGED

Will sell as complete unit or as individual machines.

Write, Wire, or Phone Collect For Complete Details and For Our Special Low Prices

UNION STANDARD EQUIPMENT Co
318-322 Lafayette Street
New York 12, New York
Phone: Canal 6-5334

Get LOW COST PRODUCTION with good REBUILT EQUIPMENT

MIXERS

NEW and Rebuilt ribbon blenders; all sizes Heavy duty MASS Mixers

KETTLES-TANKS

Stainless Jacketed Kettles in stock all sizes up to 500 gal. Vacuum Pans, Evaporators; Stainless Mixing Tanks

DRYERS-STERILIZERS

Drum Dryers, Apron Dryers, Cabinet and Truck Dryers; Steam Jacketed Sterilizers up to 48" x 42" x 96"

PFAUDLER VACUUM PANS

and REACTORS; big stock of Glass Lined Jacketed Agitated Pressure Vessels

FILLERS

M. & S. 10 Pocket Stainless Can or Jar Fillers; others. FMC & Elgin Piston Fillers; Juice Fillers by FMC & Horix. Karl Kiefer Rot. Vac. Fillers

LABELLERS

Wrap Around Can Labellers; Aut. & Semi. Aut. Labellers by New, Jersey, World, etc.

MISCELLANEOUS

Filters, Filter Presses, Centrifugals, Extractors, Cutters, Dicers, Juice Extractors, Pulpers, Colloid Mills, Homogenizers, Case Gluers and Sealers and Packaging equipment.

Send us your Inquiry

FIRST MACHINERY CORP.
209-289 TENTH ST.
BROOKLYN 15, N. Y.
STerling 8-4672

A BRILL BUY
. . . IS THE BEST BUY

SPECIALS

1—I.R. 136 Ton Jet Refrigeration Unit.
1—Buflovak 42"x90" double drum Dryer.
1—Buflovak 6'x5'6" Monel single drum Flaker.
1—Struthers-Wells 5'x15' nickel Rotary Vacuum Dryer.
1—Hersey 18"x12' Hot Air Rotary Dryer 304 S/S.
1—Rietz 30' "Thermoscrew" Screw Conveyor Dryer 304 S/S.
2—Bird 18"x28" Continuous Centrifuges 310 S/S.
1—AT&M 42" Suspended Centrifuge S/S.
6—Sweetland Filters #3, #5, #7, #10, #12.
7—Day, "Cincinnatus" Sigma Blade Mixers 660, 250, 150, 100 and 50 gal.
2—Robinson S/S jacketed Powder Mixers 90 cu. ft.
1—Fitz. Model "D" Comminuter.
1—#4th Mikro Pulverizer.
4—Rotex Sifters 40"x120", 40"x84".

BRILL
EQUIPMENT COMPANY
2401 Third Ave., New York 51, N. Y.
OR
4101 San Jacinto, Houston 4, Texas

E.C.H. SPECIALS

New 74 cu. ft. SS Spiral Mixer.
Poney Labelers, Mod. ML.
Glen 120 qt. 4 speed Mixer.
MRM S/S 12 Spout Rotary Vac. Filler.
New S/S Sturtevant #7 Rotary Blender.
Pneumatic Scale Labeler, serial 9894.
Capem SIF Capper, Caps up to 88 mm.
Standard-Knapp Wrap-around Labelers.
Phila. 2 piston S/S Filler, with motor.
Premier 8" SS Colloid Mill, 30 HP mtr.
Resina Capper, twin, 120 per min.

NEW—STEEL & S/S MIXERS, KETTLES, TANKS & DRYERS
Fabricated To Your Specifications
Engineering Advice Available

WE BUY COMPLETE PLANTS OR SINGLE UNITS
WHAT HAVE YOU FOR SALE?
YOU CAN BANK ON
EQUIPMENT CLEARING HOUSE, INC.
111 33rd Street, Brooklyn, N. Y.
SOuth 8-4451—4452—8782

BUSINESS OPPORTUNITIES

Wanted: Well rated food company desiring to add processing of pickle products to present lines, Fresh-pack salt stock, all varieties to Jar, Sweet Dill etc. Successful food chemist 20 years consulting experience. BO-8290, Food Engineering, 520 N. Michigan Ave., Chicago 1, Ill.

Food Market—Appliances hardware, paints & property. Choice location in prosperous & growing North Carolina city. Long established. Receipts $128,734.04 can increase. Substantial net profit. Equipment finest possible. Bldg. 33x106. Profitable sound opportunity. Priced right. Rendlog Sales Co., 1775 B'way, NYC. PL-7-4345.

ANNOUNCEMENT

Our New Location

293 Frelinghuysen Ave.
Newark, New Jersey
TAlbot 4-2050

Expanded facilities will enable us to serve you more fully than heretofore.

Send Us Your Inquiries and Lists of Surplus

THE MACHINERY & EQUIPMENT CORP.
Harry Pearlman, Pres. Bill Wolf, Vice-Pres.

FOR SALE

100 to 300 gal. S.S. Mix Tanks, water jkt.
225 gal. Vert. S.S. Tanks, insulated.
250 gal. Vert. S.S. Tank, insul., agit.
3—475 gal. Vert. S.S. Tanks, 3'6" x 6'6".
650 gal. Horiz. S.S. Tank, insul., 4'x7'.
500 gal. Pfaudler G.L. Tank, T.C. Coil.
42" Buflovak S.S. Vacuum Pan.
36" & 60" S.S. Vacuum Pans.
125 to 1500 gal. Homogenizers or Viscolizers.
Hope 3 Plunger Filler, M.D.
3000 gal. Glass Lined Tanks, insulated.
3—#10BB Waukesha Pumps, 1 H.P.
#25BB and #55BB Waukesha Pumps.
50 gal. S.S. Premixer (Tank), side agit.
26" Vercione Centrifugals, copper baskets.
3 H.P. Frick Freon Compressors.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

2—600 gal. S.S. vacuum processors equipped for heating and cooling self contained ammonia to sweet water circulating system.
1—C-B Superplate, double frame, 140 S.S. plates, 5 transfer headers.
1—Model 8-5 Mojonnier S.S. Tubular Heat Exchanger.
1—S.S. Plastic Cream Cooler.
1—1200 gal. vertical, Jensen, S.S. coil vat.
2—600 gal. copper hot wells.

NEENAH MILK PRODUCTS Co.
Neenah, Wisconsin

EQUIPMENT WANTED

1 Raymond or Sturtevant Air Classifier 3 or 4 feet.
1 Micro Pulverizer equipped with 20 H.P. Motor.

W-9484, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

If there is anything you want that other readers can supply
OR . . . something you don't want— that other readers can use—
Advertise it in the
SEARCHLIGHT SECTION

For Sale At Great Savings
MODERN REBUILT MACHINERY

UNION Rebuilt Machinery Established 1912

MIXERS

Day Robinson Dry Powder Mixers and Sifters, from 50 up to 10,000 lbs.
Day, New Era, Hottman Mixers 2 to 3500 gals. with and without Jackets, Single and Double Arm Agitators.
Rotex, Day, Robinson, Gayco, Tyler Hummer, Selectro Sifters.
Barbour-Stockwell 100 gal. Stainless Steel Steam Jacketed Paste Mixer.
Groen 150 gal. Stainless Steel Steam Jacketed Mixing Kettles.
Baker Perkins size 16-X-BB Vacuum Double Arm Steam Jacketed Mixer.

FILLERS & CAPPERS

Filler, Hope, Elgin S.S. Piston Fillers.
Elgin 24-Head Rotary Vacuum Filler.
Resina LC Automatic Capper.
Capem 4-Head Capper.
S. & S. G1, G2, G6, HG88 Auger Fillers.
Triangle Package Models U1, A3, A1C, G2C, A6CA Elec-Tri-Pak Fillers.

WRAPPERS

Stokes & Smith Models B and BB Auger Transwraps.
Doughboy and Pack Rite Automatic Rotary Bag Sealers.
Standard-Knapp No. 429 Carton Sealer.
Hayssen, Package Machy. Co. FA, FA4, DF, CA2, Miller, Scandia and Oliver Automatic Cellophane Wrappers.
Hudson Sharp Campbell Automatic Cellophane Wrappers, Models 2W6, 2W8 and 2W10.
Forgrove Model 26D Foil Wrapper with underneath fold and adjustable jaws.

LABELERS

Burt and Knapp Adjustable Wraparound Labelers.
Pony late style ML Labelrite.

MISCELLANEOUS

Sanders 20HP Meat or Fruit Grinder.
Brown PFM Automatic Bag Filling Machine.
Fitzpatrick "D" S. S. Comminuter.
Mikro 3TH, 3W, 2TH, 1SH Pulverizers.
Charlotte 3 HP Monel Colloid Mill.
Stokes D, DD2 and RBB Tablet Machines.
Colton 2RP and 3RP Rotary Tablet Machines.

Available For Immediate Delivery — Write, Wire, Phone For Details
Act Now For Choice Selection

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette Street New York 12, N. Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

SPECIAL OFFERINGS
MODERN PACKAGING EQUIPMENT

STANDARD-KNAPP Model 429 Case Sealer and Compression Unit.
PNEUMATIC SCALE COMPANY Cartoning Line, Consisting of: Automatic Feeder, Bottom Sealer, Filler, Top Sealer & Compression Unit.
PNEUMATIC SCALE COMPANY Tightwraps, High Speed.
PNEUMATIC SCALE COMPANY, WORLD and **PONY** fully automatic and semi-automatic Labelers, 60-120 per minute.
CONSOLIDATED 4 and 3 Head Fully Automatic Cappers.
PNEUMATIC SCALE COMPANY and **KARL KIEFER** 16 Head Fully Automatic, Stainless Steel Vacuum Fillers.
HAYSSEN Model 8-11 Cellophane Wrapper, latest type.
STOKES & SMITH Model H.G. 84, G, GD and G6 Auger Fillers.
STOKESWRAP Model A with electric eye, counter, stainless steel auger filler.
Partial List—send for complete list of equipment in stock.

WANTED

PNEUMATIC SCALE Large Liners
All Types of Bottling and Cartoning Equipment
PACKAGE MACHINERY CO. Model FA or FAQ Cellophane Wrappers.
Will Buy Single Machines or Entire Plants

ALLIED EQUIPMENT CO.
940-946 Nepperhan Ave., Yonkers 3, N. Y.
Phone Yonkers 5-0442

FOR SALE

1—Buflovak #6.5 Stainless Steel Double Effect Evaporator—588 sq. ft.
1—Conkey Triple Effect Evaporator, Herculoy tubes—1900 sq. ft.—UNUSED
1—Goslin Birmingham Quadruple Effect Evaporator, copper tubes—6685 sq. ft.
2—Davenport 2A Grains Presses
2—Davenport 6' x 40' Rotary Steam Tube Dryers
1—Stainless Steel Spray Dryer, 19' dia. x 20' high.
1—Bowen 5 dia. Stainless Steel Spray Dryer
1—Overton 24" x 60" Double Drum Dryer —UNUSED
2—Ammonia Compressors: York 12½ x 14½; York 11 x 13; Frick 9 x 9; Frick 8 x 8
2—Triangle G-2-C Elec-Tri-Pak Weighers and Fillers
4—Mikro Pulverizers, #2DH, #2-TH, #3-TH
4—225 gal. Vertical St. St. Tanks with Side Agit.
1—10,500 gal. Horizontal Stainless Steel Tank. UNUSED
1—2000 gal. Vertical Stainless Steel Tank. UNUSED
25—Stainless Steel Tanks—30 gal. to 6500 gal.
10—4700 gal. Horizontal Brewery Glass Lined Welded Tanks.
2—14,000 gal. Horizontal Glass Lined welded Tanks
25—Stainless Steel and Stainless Clad Steam Jacketed Kettles, 40 gal. to 500 gal.
2—Mojonnier Stainless Steel Vacuum Fillers, model 90
1—Hope type 18 Semi-Auto Single Piston Filler, St. St., Rising table, agitated hopper
2—Patt.-Kelley Twin Shell St. St. Blenders, 5 cu. ft.

BOTTLING CANNING MACHINERY PERRY SUPPLIES PROCESSING

PERRY EQUIPMENT CORP.

1411 N. 6TH ST.
PHILA. 22, PA.

Phone:
STevenson 4-7210

Inventory Clearance Sale—Bargains

Conveyors—Portable Belt Boosters, Stationary Belt Boosters, Heavy Duty Belt Conveyors, Tapered Roller Curves, Bottle Conveyors, Motors, etc.

Write for list with prices and bulletins.

ISLAND EQUIPMENT CORP.
27-01 Bridge Plaza North, Long Island City 1, N. Y.

FOR SALE

30" Copper Coating Pans with steam coils
300 gal. Copper Still with condenser and tank
100 qt. 3 speed Read Master Mixer
80 qt. M-80 4-speed Hobart Mixer
100 gal. Copper Steam Jacketed Mixing Kettle
York Freon Compressor with 1½ HP 3 phase motor
Burns Split Nut Peanut Blancher

SAVAGE BROS. CO.
2636 Gladys Ave. Chicago 12, Ill.

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CHICAGO 11 ..... Harvey W. Wernecke
520 N. Michigan Ave. ... Mohawk 4-5800
CLEVELAND 15 ..... Tom E. Taylor
1510 Hanna Bldg. ... Superior 1-7000
DALLAS 1 ..... Gordon Jones
First National Bank Bldg. Prospect 7-5054
DETROIT 26 ..... Tom E. Taylor
856 Penobscot Bldg. ... Woodward 2-1793
LOS ANGELES 17 ... William C. Woolston
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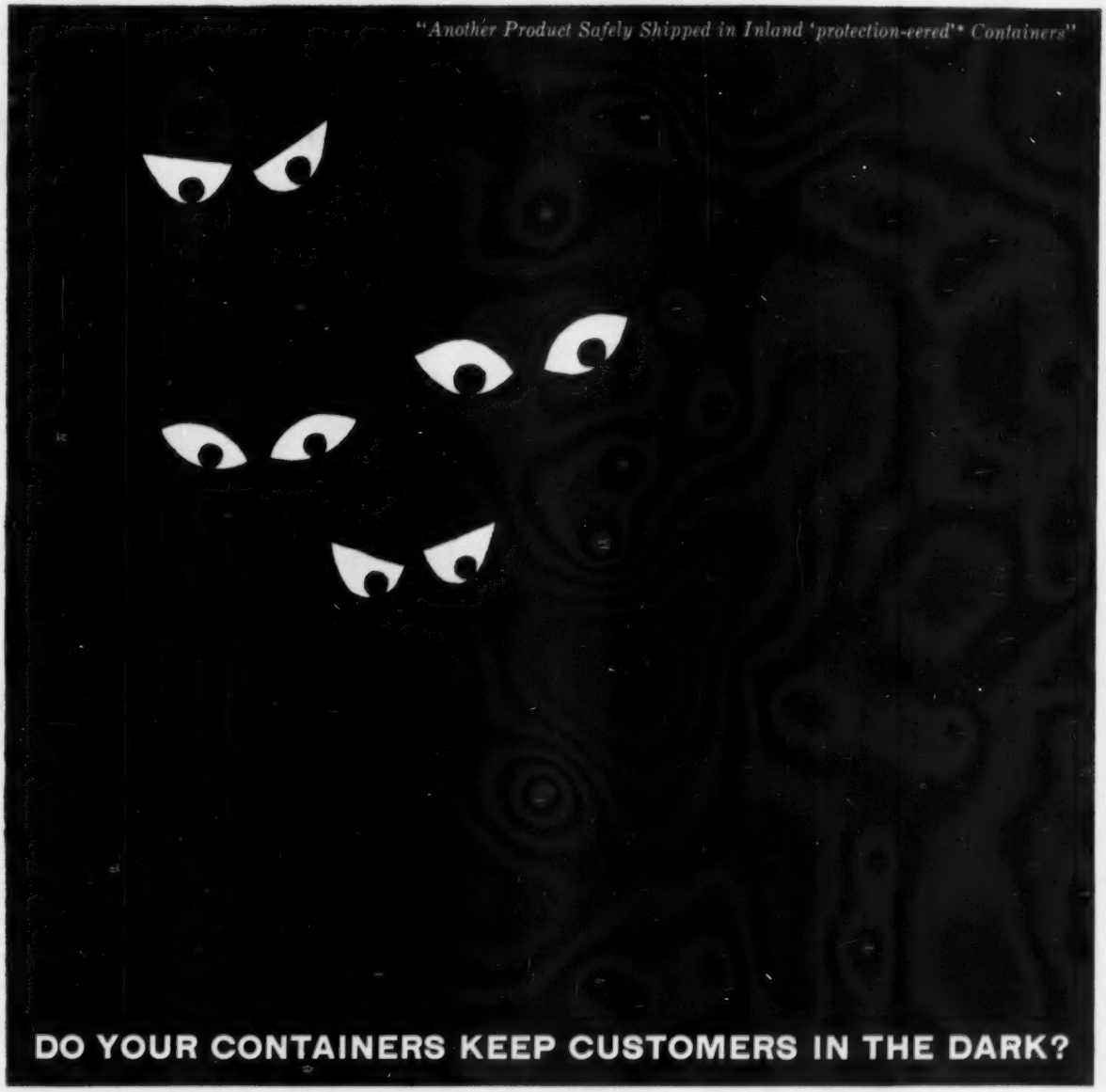

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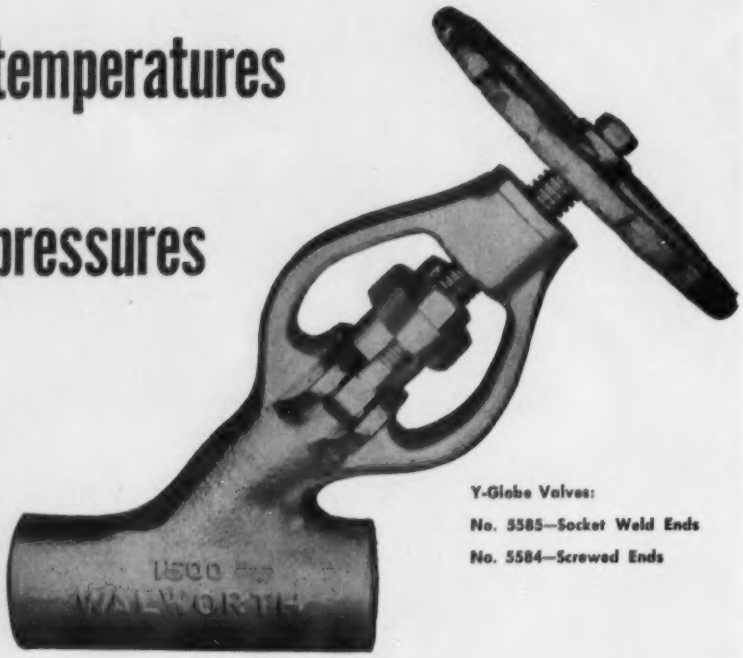

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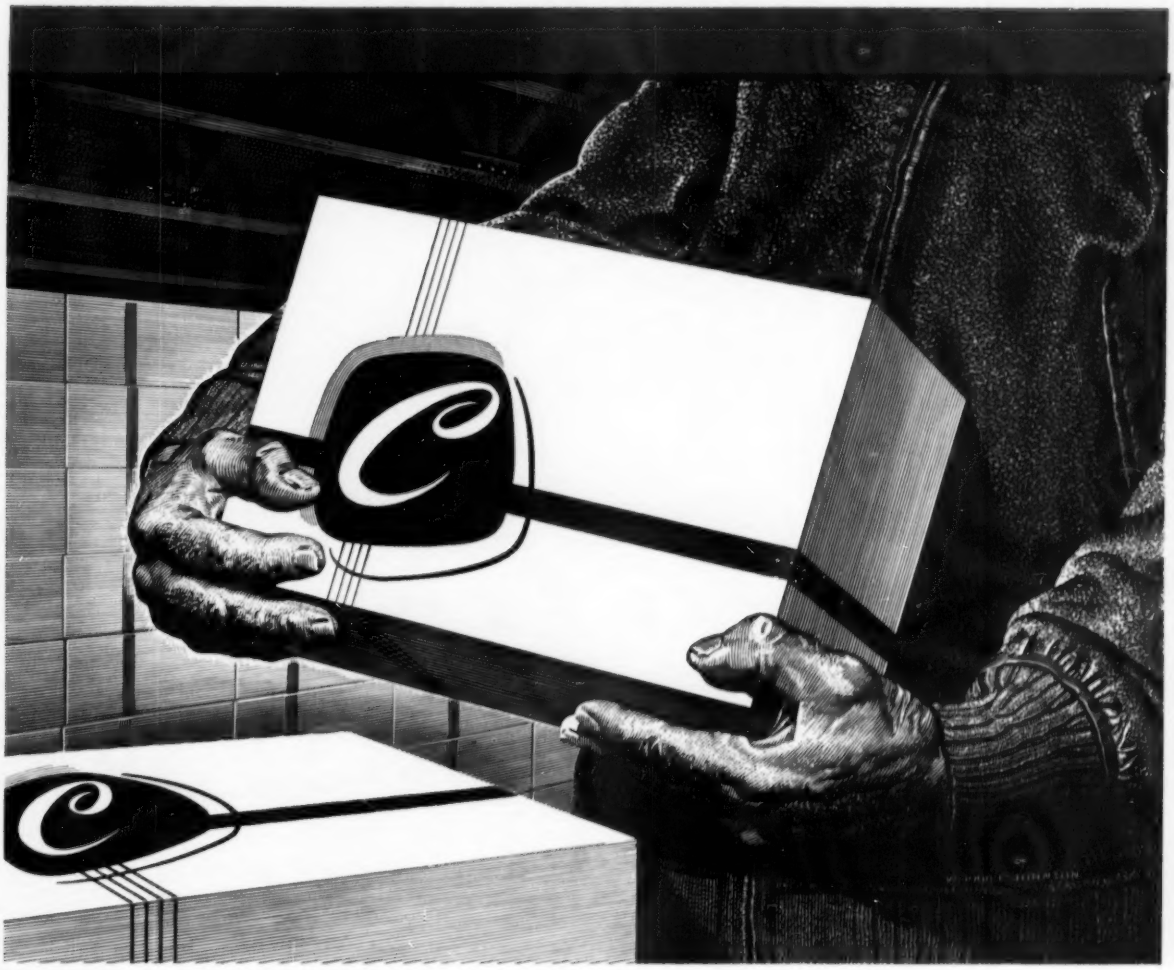

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